ARMY ORDNANCE

VOL. XV, No. 86 SEPTEMBER-OCTOBER, 1934

Munitions Makers and Common Sense
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Recapture of War-time Profits
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War of Tomorrow
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Supervision of the Trade in Arms
(The Treaty)

Facts About Munitions Makers, III
An Editorial

A BIMONTHLY REVIEW OF AMERICAN MUNITIONS
PUBLISHED BY THE ARMY ORDNANCE ASSOCIATION, WASHINGTON, D. C.

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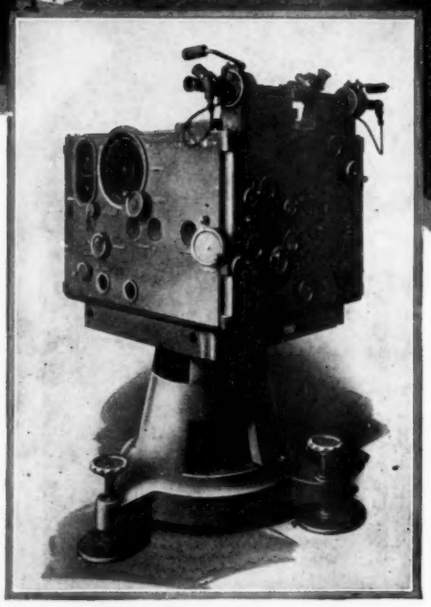

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The Journal of the Army Ordnance Association

Now in its Fifteenth Year of Publication

Fledged to Public Service in Effecting Industrial Preparedness for War as Our Strongest Guarantee of Peace

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"The great results which have been developed and brought to light by this war (*i. e.* the Mexican War, 1846-47) will be of immeasurable importance in the future progress of our country. They will tend powerfully to preserve us from foreign collisions, and to enable us to pursue uninterruptedly our cherished policy of 'peace with all nations, entangling alliances with none'."—*President James K. Polk, Fourth Annual Message to Congress, December 5, 1848.*

The Army Ordnance Association

THE Army Ordnance Association is a national organization of American citizens pledged to industrial preparedness for war as our nation's strongest guarantee of peace.

The Association endeavors to keep alive an interest in and knowledge of the design, production and maintenance of munitions. Other than a few manufacturing arsenals—six in all—there is no peace-time industry for the production of ordnance. Should war unhappily come again, industrial America will be called upon to produce munitions in great quantity and of intricate and unusual design. In an emergency time will not permit careful study or long preparation for the production of munitions. The problem is one of vital concern.

THE Army Ordnance Association believes that the solution of this problem, based on experience, lies in an active organization at all times coöperating with the Government. The principal objective of the Association is an active membership of American citizens, on whom the duty of design and production of munitions will fall in war, who will have an accurate and authentic knowledge of the complex requirements of ordnance. "Peace insurance" in this form is the foremost aim of the Army Ordnance Association.

The Association is devoted solely to the national defense; it has no commercial interests, no political alliances, and no religious affiliations. It is not operated for profit: its income is expended in furthering its aims. Its officers and directors serve without remuneration.

ARMY ORDNANCE, the journal of the Association, is published solely for the purpose of disseminating information on the progress of our munitions developments so that American industry may at all times know its responsibilities to the common defense.

The objectives of the Association as set forth in its Constitution are:

To assist in effecting industrial preparedness for war as being one of the nation's strongest guarantees of peace;

To keep available the highly specialized knowledge necessary for arming the manhood of the nation by stimulating interest in the design and production of ordnance material;

To promote mutual understanding and to effect cooperation with American scientists, inventors, engineers and manufacturers in civil life and the regular and reserve officers of the Ordnance Department;

To provide, when required, the services of competent committees to investigate and report upon special ordnance subjects;

To assist in developing and maintaining an efficient personnel, both commissioned and enlisted, for the units required for Ordnance Field Service in the event of an emergency;

To commemorate the services rendered by the industry of the nation and by the officers and civilian employees of the Ordnance Department in the wars in which the United States has been engaged.

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Brigadier General Edward M. Shinkle
Assistant to the Chief of Ordnance of the Army

ARMY ORDNANCE

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Munition Makers and Common Sense

With an Account of War-time Bombing in the Briey District

By Hoffman Nickerson*

WHETHER or not we are descended from monkeys, certainly many things happening today might tempt a cynical or pessimistic man to believe that large sections of the human race are intellectually degenerating toward the monkey stage. A striking example of this is the current controversy over munition makers.

Today much popular writing assumes that in order to be warm in the heart one must also be soft in the head. The means for doing things are constantly confused with the ends for which the things are done. Symptoms are mistaken for causes and secondary causes for primary ones. It has been well said that unwillingness to use the mind soon becomes inability. People who sell poisonous food or liquor are deservedly punished but those who peddle nonsensical ideas are praised (and often well paid) as lofty "idealists." If anyone points out their absurdities they try to howl him down as in league with the powers of darkness. Nevertheless the refutation of error is always useful, so let us assume that we have some male or female sob sister before us, like a witness who must answer a few simple questions.

First then what are weapons and munitions? They are instruments of war. And what is war? It is organized force used between two human groups, each seeking to impose its will upon the other. Modern weapons are elaborate and costly, yes. But that is because the modern world possesses great command over nature through physical science, complex industrial technique, and greater wealth than any previous period known to history. In every age the tools of peace have been potential weapons, the stone axe and the knife as much so as the metallurgy, the chemical, and other knowledge which serves us today. But did war begin with our complex modern fighting machinery? Every school child knows that it did not. And would war cease if—by miracle—every weapon on the planet were to disappear? Obviously not. Rifles and cannon, tanks, warships and airplanes are not living creatures with wills of their own which go about the world attacking one another; they are only tools in the hands of men. Man is a more unstable compound than TNT; his envies and hatreds are more poisonous than any gas ever dreamed of. But men and women ought not to envy and hate others! Most certainly, dear reader, they ought not. But they do.

ACCORDINGLY to say that arms cause war is like saying that police forces cause crime or fire engines fires; no human group would arm merely for the fun of the thing, all do so because of some policy, some desire to influence other groups or to avoid being influenced by them. The importance of armament is entirely relative: if group A be better armed than B, the superiority will greatly influence their relations. But if both are about equally armed or disarmed their status cancels out. Imagine two groups unable or unwilling even to pick up sticks and stones but furiously hostile; nothing could prevent their killing each other off to the last man with their hands, feet and teeth—if they chose. Historically the simplicity or complexity of weapons has had absolutely nothing to do with the savagery of war. When the Romans, in the agony of their attempt at a self-governing republic, repeatedly massacred each other throughout a century of atrocious civil wars, when the fierce Mongol warriors of Timur and Genghis Khan built their great pyramids of severed human heads, these doings were the aftermath of battles fought with weapons very primitive compared with ours. Only three centuries ago the Thirty Years War killed off three quarters of the population of Germany, to an accompaniment of plagues, cannibalism, etc., etc.—all this notwithstanding the crudity of Seventeenth Century cannon and muskets. Negatives are hard to prove but there seems no instance in history of a single war directly caused by armaments. Certainly the American colonies were not heavily armed in 1775, or the North and South in 1860. Indeed had the Eighteenth Century British government and the Nineteenth Century U. S. government been better prepared, the American Revolution and the Confederacy would doubtless have been promptly suppressed without the prolonged conflicts which actually took place. In other words, armaments in the hands of governments tend to shorten civil wars; in certain cases they might tend to prevent such wars altogether. Even in the destruction of inanimate things, where one would expect high explosives to make a difference, we find that they do not necessarily do so; the Romans destroyed great cities like ancient Carthage and Jerusalem more completely than the Germans did little Verdun.

HAVING briefly reviewed these elementary truths, let us bring them to bear against a few common errors. How do the antiarmament people support their first charge (a) that munition makers are a chief cause of war, and (b) that the aforesaid munition makers act to prolong wars when begun? When yellow journalism first made its not altogether happy and blessed appearance, educated people were accustomed to

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call it The Gutter Press. Today that term no longer applies. Our present merchants of unreason do not shriek so wildly; their minds no longer inhabit the gutter. Instead they may be fairly said to inhabit a bungalow, of flimsy construction, imperfectly lit in the evening by a faintly flickering candle. As an example of bungalow journalism let us glance at the article "Arms and the Men" originally published in *Fortune* and reissued—with certain interesting changes in the text—in pamphlet form.

Every error, however gross, must be mixed with a little truth in order to succeed. In the background of all present discussion of the problem of war are several important and obvious truths. The war of 1914-1918 was an irrational act. Its heavy sacrifices have borne no adequate fruit and yet another European war seems imminent. Obviously, munition makers did not invent intense national patriotism, and had nothing to do either with the trench stalemate which postponed the military decision, or with terms of the Treaty which has proved neither a peace of reconciliation nor one of destruction, *i.e.*, destruction of Prussian power.

Meanwhile in the foreground are certain other truths. Every civilization which permits any international trade will produce some traders more or less internationally minded. It is in the nature of economic activity to overflow artificial divisions of the earth's surface such as political boundaries. All business must make profits in order to live, and the desire for gain may tempt men to forget their duties as citizens. But this does not mean that any particular men or group of men has necessarily played the scoundrel. There must be reasonable ground for suspicion and some real proof.

What does the bungalow-journalist make of these familiar truths? He says in effect: the peoples of the world are virtuous and innocent, their vices and follies, particularly the folly of irrational war, are inflicted upon them by a gang of devils known as the armament makers, whose "axioms . . . are (a) prolong war, (b) disturb peace" (page 1). Groping in the shadows of the ill-furnished and badly lit bungalow, we stumble over repeated inconsistencies and errors. Page 3 says, ". . . it cost about $25,000 to kill a soldier during the World War," and on page 32: "Of course, if the French and Germans had each leveled the other's smelters, the war would have ended sooner. And so would war-time profits." Alas, there seems no possible connection between these two lines of argument; they destroy each other. Granted that 1914-1918 war-time costs were excessively large and excessively slow in producing victory. Then assume the virtually impossible event of leveling all the smelters on both sides, so that the combatants as their weapons wore out had to use sticks, stones and such chance bits of metal as they could find. Certainly this would have made the fighting more primitive, but why on earth should more primitive warfare make for an earlier peace? In earlier and simpler times plenty of wars went on and on and on. In the matter of length, the twenty-three years of the Revolutionary-Napoleonic wars, the Thirty Years War, and the Hundred Years War—to name only three out of innumerable examples—are not encouraging.

THE pamphlet contradicts itself flagrantly on internationalism. Page 5 weeps pathetically because the munition makers are ". . . working . . . for the destruction of such little internationalism as the world has achieved so far." Page 8 schoolmarms the U. S. Army and Navy Officers Corps as ". . . are far . . . more active than the officers of any other armed forces in the world against any sort of international understanding." So far we have internationalism pure and simple. I digress for a moment to note that there are plenty of good and obvious reasons why sensible Americans in or out of the fighting services should be less internationalistic than corresponding Europeans: we happen to possess a continental mass of territory protected by oceans and more economically self sustaining than any other country. Returning from this digression, one is astonished to find "Arms and the Men" next going vehemently nationalist. Page 21 mentions "Eduard Beneš, who, as Czechoslovakia's Foreign Minister, takes second place to no one in the vocal support he lends to the League of Nations"—insinuating that Beneš' well known internationalism is insincere. And then it reaches a climax in its denunciation of the De Wendel family on the ground that these French ironmasters were internationalists as between France and Germany. Again I digress for a moment to note that the De Wendels have issued a signed denial of *Fortune's* charges. Where *Fortune* says (on page 43 of the pamphlet) that the armament makers ". . . are conspirators because they have no loyalties;" the De Wendels reply that for a hundred and twenty years they have never manufactured war material, have at no time manufactured guns, and that two of them served as French officers at the front in 1914-1918, one in the infantry and the other in the artillery. They go on to explain that Henri De Wendel, who is paraded as exhibit A by *Fortune* in the effort to prove the charge of internationalism against his family, was indeed a member of the German Reichstag but went thither precisely because he was a *"protestataire,"* that is a member elected for the purpose of public protest against the German annexation of Alsace-Lorraine. The De Wendel statement mentions the improbability of a family provoking war when their properties were on the border and morally certain to suffer in the struggle, cites the harsh treatment received by those properties at German hands, and in general brands *Fortune's* charges as a pack of lies. Readers may decide for themselves whether to believe the signed statement of responsible citizens or the lurid charges of an anonymous pamphleteer. But even if we rule out the question of who is telling the truth, the fact remains that the anonymous writer cannot keep his own record straight even for a few pages. If indeed he be an internationalist and if it were true that the De Wendels had played a double game between France and Germany (which the present writer, for one, does not believe), they would have been merely acting as good internationalists in so doing.

Many other points of detail against "Arms and the Men" could be usefully made if space permitted. On page after page it acts by insinuation after a fashion recalling Pope's famous and contemptuous line

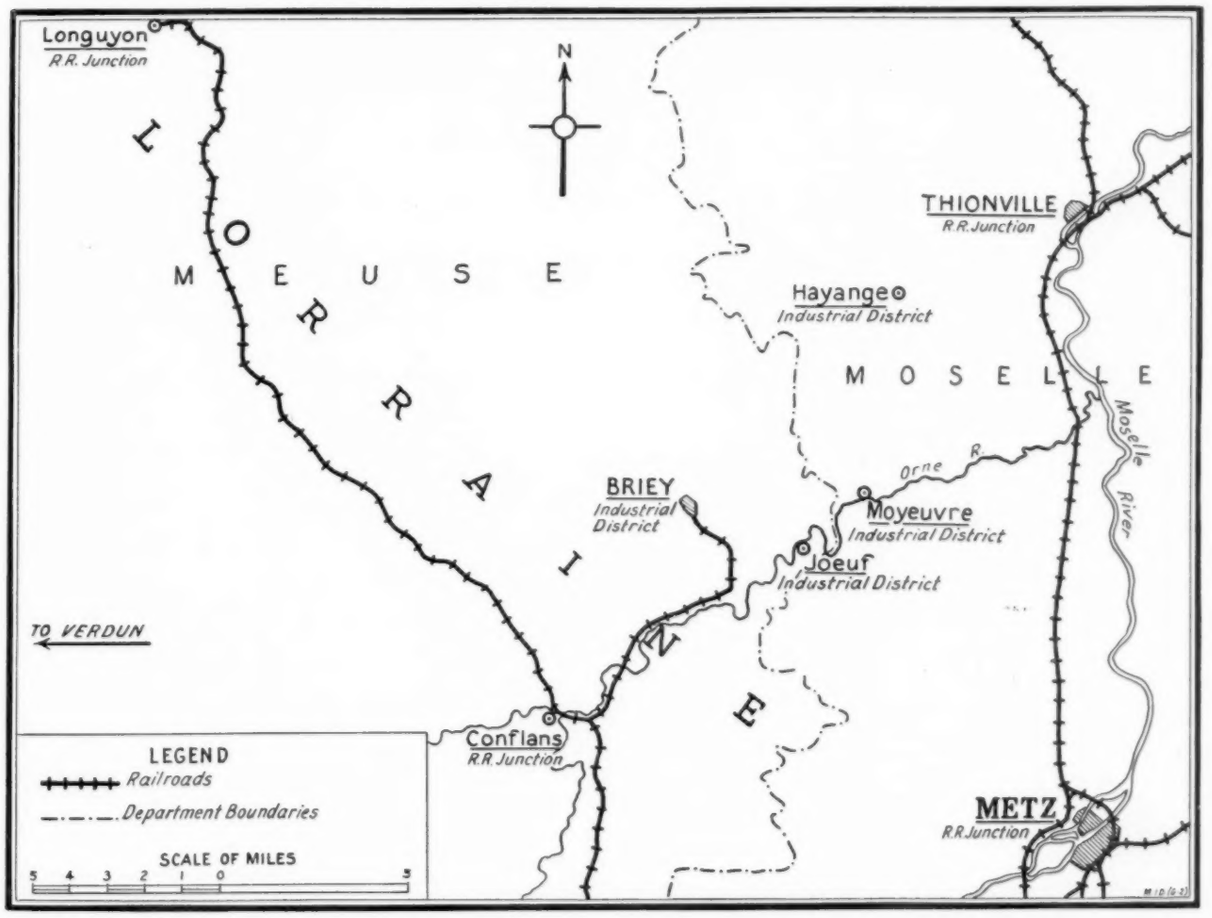
"Willing to wound but half afraid to strike."

For instance its subtitle is "A Primer on Europe's Armament Makers." American arms manufacturers are "small fry," but the implication is made that the small fry are guilty in their own way. At this point we may usefully compare anonymous writers with conspicuously public-spirited citizens like the DuPonts, whose arms business is today stated to be one half of one per cent of their turnover. There is what seems an intentional confusion between Vickers and Vickers-Armstrongs. Charles M. Schwab is said to have "dismayed" the West Point cadets by saying that Bethlehem Steel Company would never again manufacture ordnance except in great national emergencies. The "dismay" must have been news to

Sparta-on-the-Hudson. Sir Basil Zaharoff is called ". . . a doddering octogenarian, sitting in a wheel chair, awaiting death." It seems to have occurred neither to the anonymous writer or the editors of *Fortune* that they too, like all of us, will some day dodder and await death—if we live that long.

PASSING over these matters let us turn to another with which the present writer happens to have some acquaintance, *i.e.*, French war-time policy towards the Briey iron district. This region, on the 1871 borderline between France and Germany, fell into German hands early in 1914 and so remained until shortly before the Armistice. From it came a large part of the enormous German consumption of iron and steel during the war; "Arms and the Men" puts the proportion as high as three quarters which seems rather high to the writer, for the Silesian iron region was important, and by far the best ores available to Germany for high grade steel came from Sweden, whereas the Lorraine ores are poor in quality. However, the point is not material. "Arms and the Men" says that Briey was not bombed during the war at all, that French headquarters admitted its immunity but ascribed it to the corresponding immunity from German bombs of the smelters working for the French at Dombasle in the Department of Meurthe-et-Moselle. This is the pamphlet version; the original article in *Fortune* erred in placing Dombasle between the Argonne and Verdun. Continuing, "Arms and the Men" claims Briey's immunity to have been due to the international solidarity of the armament makers who corruptly influenced the French government and Army Command to abstain from using this means for ending the war by a rapid victory. On this the pamphlet comments: "There is a quality of delirium about facts like these." There is indeed, but the delirium is not in the facts but in the brains of the anonymous pamphleteer.

In August or September 1918 the present writer, on duty with the Intelligence Section of the A. E. F. Headquarters Staff at Chaumont, was ordered to collect the available data on the principal industries essential to the German army, in order to determine which industry the expected American bombing planes should concentrate on in the spring of 1919. A large scale map of Germany and her occupied territories in the west was set up, covering almost the entire wall of one side of the old French barrack room in which the work was done. The factories or other important establishments of the essential industries, ordnance, steel, coal, chemicals, explosives, textiles, were represented by tiny squares of colored paper, the largest establishments by slightly larger squares, all fastened to the map with pins. The data came in part from studies of the pre-war industries in the regions under examination, in part from voluminous intelligence reports furnished by the British and French, in part from American agents in Germany. The little bits of colored paper showed



THE BRIEY DISTRICT OF NORTHERN FRANCE.

the situation most graphically. From this survey there leaped to the eye the well known fact that the nearest important target was the Briey basin.

Now it is not true, as "Arms and the Men" asserts that the French bombing squadrons neglected the Briey basin; in fact they made strenuous efforts to keep the Briey ore from reaching Germany. It is true that the chief effort was not made directly against the mines and blast furnaces but against the four railway junctions, Conflans, Longuyon, Thionville (which the Germans call Diedenhofen), and Metz through which the ore was transported to Germany. This policy was not brilliantly successful. As with almost all war-time policies, many argued and murmured against it at the time. The present writer took note of the objections and saw no reason against recommending to his superiors the direct bombing of the iron fields should that seem desirable.

THE investigation took two forms: first checking up on conditions throughout the Briey region, second studying the results to be expected from air bombing. In both the present writer was assisted by two French officers, one of them a Captain Castin, in civil life mayor of the town of Briey itself, whose war record had gained him not only the Croix de Guerre but also the Legion of Honor. In company with Castin the writer went to see Francois De Wendel who made no difficulty about receiving us; his figures for the pre-war state of his properties tallied with ours. He had, he said, no certain information of what the Germans had done since occupying the district. If he had any idea of corrupting or even of influencing the writer he certainly gave no sign of it: his attitude toward the whole matter was the eternal French *"C'est la guerre."* We also saw another member of the Comité des Forges, with much the same result.

We next took up the question of damage from air bombardment. Like most others who have had the experience, the present writer had been very badly frightened when first bombed from the air. But happening to be in Paris several times during intensive German raids he had made a point next day of going to look at the damage, and had been astonished to find it so insignificant compared with the hostile effort. Sometimes a building would have its roof a little knocked about, but of general devastation there was absolutely none. Also the intense fright of the first experience soon wore off, so that it became too much trouble to go down cellar when one was comfortably in bed. In passing let us note that the collection of fuller data since the war has fully confirmed this view: for instance the Germans made over 100 raids in England and dropped about 280 tons of bombs with the insignificant result of 1,413 killed and 3,408 wounded, a flea bite compared with battle casualties or even with American traffic accidents. The English in spite of intensive bombing were never able to destroy the locks at Ostend and Zeebrugge which the Germans were using for submarine bases. The damage done by Allied aviators in the Rhineland was equally insignificant, and on the four railway junctions near Briey it was almost nil. When the propagandist author of "Arms and the Men" imagines that French bombing planes could have blasted the Briey basin out of existence, he is himself being deceived (like so many others!) by the propaganda of air boosters. But to return to 1918: since time pressed, we did the best we could with such data on loss from air bombing as we could get. Among other records, those of the nearby city of Nancy which lay just inside the French lines and had been repeatedly bombed, had been carefully kept. Almost no one had been killed there, and practically no property destroyed. From all sides a noticeable proportion of factory workers were reported absent from work on the days following raids. Presumably the men stayed at home to hold their wives' hands and discuss with neighbors how much harm the last bomb might have done had it landed nearer than a quarter of a mile away. But these absences were the only result of any consequence. The material damage from air raiding being so insignificant, we noted the desirability of increasing that damage through secondary explosions produced from material already present which might be detonated by the original explosion of the airplane bomb.

The choice of targets was of course limited by the range of the bombers. Essen, the site of the great Krupp works, which would have been the ideal spot to strike, was too far away to promise good results. The same was true of the other factories and the coal fields in that neighborhood. Also coal mines seemed not particularly interesting targets in themselves. The Briey iron region, although easily accessible, seemed even more unpromising; the chance of secondary explosions from iron mines or blast furnaces was obviously nil and that of serious damage to them extremely small. There was an important pre-war factory of explosives at Rottweil in the Black Forest but its site was difficult to locate from the air and most of the pre-war explosive industry was out of reach. Textiles were of secondary importance.

THERE remained the chemical industry. Much of it, if not quite so accessible as Briey, was nevertheless within easy reach at Mannheim and the other cities of the upper-middle Rhine. Chemical factories can easily be converted to the manufacture either of explosives or poison gas. A lucky hit on a factory manufacturing explosives would produce a secondary explosion capable of doing vastly more damage than any airplane bomb. Again, could important quantities of poison gas be set free by the detonation of a bomb, that too might produce results.

On the purely military ground of hoping for secondary explosions, the writer was preparing to recommend to his superiors an attack upon the German chemical industry when the Armistice came. Since the French bombers had been unable seriously to damage even the four railway junctions, there seemed little reason to expect that bombing could have affected the large Briey region as a whole. By comparison, if the persistent effort of an air fleet had utterly failed to damage four designated city blocks in Pittsburgh, would any sensible commander have ordered his forces to dissipate their efforts over a circle some ten miles in radius all around that city? The French had valid political reasons as well: about half of Briey's inhabitants were French, most of the nominally German half were French speaking and French in sympathy. All would again become French in the event of a victory. Nevertheless the writer found no Frenchman insistent on these political reasons. Practically all were thoroughly tired of the war and would have jumped at any reasonable chance of speedy victory.

Obviously the present short paper is far from exhausting the subject. At all events the writer had some definite connection with the Briey affair; also, unlike the anonymous writer in *Fortune,* he is capable of the very moderate degree of courage required for signing one's name.

Recapture of War-time Profits

Price Control and Taxation The Only Equitable Methods

By Bernard M. Baruch*

"TAKING the Profit out of War" is a phrase that has become popular but, as is often the case with catch words, so often repeated by those for whom it has no real meaning that it is likely to become meaningless itself.

The profit motive is one, which in my judgment, society is not yet ready to eliminate! But, society is ready, and it does demand the elimination of profiteering and above all the profit incentive to war. Even under the fiery spell of patriotism, even under the great surge of emotions called into life by war, the factor of gain is still present. I do not preach the millennium. To me the phrase "Taking the Profit out of War" does not mean the entire extirpation of individual profit; it does not mean that we can get along without the spur to action that the hope of profit provides. To do so would be to assert the counsel of perfection so devoutly to be wished. Those engaged in manufacturing operations, which are shifted from private to public business must still be allowed a margin, sharply reduced, between their outgo and their income. However patriotic their impulses may be, the opportunity for personal profit will bind them even more tightly to the wheel of public service.

Having said that in a negative way, it becomes necessary to explain what the formula *does* mean positively. It means, at least to me, the recapture of all profits, in bulk, made by all industries engaged in war supplies, above a small and reasonable return on the moneys invested. This recapture can be done only through a control of prices, together with increased taxes in wartime. While money must be given a wage, or it will not work, the wage must be less than in peace time and must bear comparison with the sacrifices made by the men in the field. Some of my friends may disagree with the need of wages for capital, but the fact remains that all history shows it to be axiomatic. Indeed, we take an enormously long stride forward, and one that will be attacked bitterly by the conservatives, when we advocate to clamp down on profit-making, and seek to skeletonize it, and eliminate it in war. That is precisely what I advocate, and that is what must be done. It is the first requirement of any approach to social justice. It is a safeguard to subsequent economic security for, by limiting prices and profits during wartime, we can prevent the vast and sometimes unnecessary expansions that played so large a part in bringing about our present post-war confusion.

I WANT to put a ceiling over prices and profits, above which no prices and profits may go. Thereafter, a tax program must be enacted that will take away, in totality, the spread between the selling prices and the costs, plus a reasonable return. That is what I mean by "Taking the Profit out of War." Then there will be far less profit in war than in peace.

By parallel planning, there must also be a control over all prices, goods, foods, rents, wages, services; in short, of all activities that yield profit. *All* must be denied the right to indulge in a joy-ride at the expense of the nation. The control of dollars must be made applicable to the entire citizenship, regardless of their classification. War, Napoleon said of Prussia, was that country's most profitable industry. That charge should never be permitted against our nation. Incidentally, I hold the belief that the last war was profitable to nobody—neither to individuals nor to nations. Where are the war brides of 1914-18? Gone where the woodbine twineth. They died unmourned and most of them poor. They made apparent profits but none of permanent nature. We should even avoid a first appearance of profit, for war is too horrible a thing to permit any advantage to be gained therefrom.

You gentlemen of the Army Industrial College represent a paradox. You are men of war, seemingly living a quiet, peaceful existence, while your civilian brethren, men of peace in theory, are engaged in a bitter war against the depression. But there is a common ground on which you both stand, for the war they are fighting now grew out of the war *you* fought sixteen years ago. The maintenance of peace is perhaps the most difficult job in the world today. At any moment its delicate processes may be shattered and chaos may overwhelm us. The interdependence of the world is something against which no nationalism, no matter how strongly developed, can prevail. In fact, paradoxical though it may be, the stronger the nationalism, the less certain is peace.

While we civilians fight now, you prepare to fight later should the need arise. From you must come the plans so that the nation may be ready, if necessary, to battle for its very existence.

Your duty is to keep the war-making agency in such close touch with industry that when called upon it will be able to bring to the defense of the nation all of its resources. You must study and plan so that when the necessity arises a peaceful nation may instantly become a nation at arms fully equipped.

WE all are of the common belief that war ought to be avoided at all hazard, but we must plan that if war comes, we shall meet the enemy with our maximum effectiveness with the least possible injury and violence to our people, and in a manner which shall avoid inflation and waste. Plans to eliminate war profiteering should provide that each man, each business, every thing and every dollar shall bear its just proportion of the burden. These plans should be designed to avoid the prostrating economic and social aftermath of war and, finally, should be laid with full recognition that modern war is a death grapple between peoples and economic systems rather than a conflict of armies alone. To that end, we should merit for industrial America something of what Field Marshal Von Hindenburg in his retrospect of the World War had to say of the American effort in 1918—"Her brilliant, if pitiless, war industry had entered the service of patriotism and had not failed it. Under the compulsion of military necessity a ruthless autocracy was at work and

*Chairman, War Industries Board, 1918. This is an address delivered at the Graduation Exercises of the Army Industrial College, Washington, D. C., June 23, 1934.

rightly, even in the land at the portals of which the Statue of Liberty flashes its blinding light across the seas. They understood war."

Your studies have already shown you that in any major conflict the entire population must cease to be individuals following a self-appointed course and become a vast mechanical unit composed of co-related moving parts all working to the end of directing practically all the national material resources to the single purpose of victory. Modern war requires that the full power of the nation be exerted in the shortest possible time, not only for the purpose of destroying the enemy by material forces, but also by the process of slow and often insidious economic strangulation and political isolation. We must use all the means of transportation, communication and supply which will permit us to bring in our enormous mass of men and material at a given moment at a given spot. Science is creating destructive forces which require for their use, or for defense against them, the products of practically the whole industry in quantities many times those required for the uses of peace.

I need hardly bring to your attention what must be done by a nation in arms,—the discipline and mobilization of its moral and material forces. Judgment born of experience shows that the moral or spiritual is the greater of the two forces. The destruction of its morale did much to defeat Germany. Ludendorf bitterly complained his military front remained impregnable long after what he called "the home front" had crumbled. Napoleon said: "In war, the moral is to the physical as 3 to 1." Civil morale therefore, is fully as important as military morale. To obtain this civil morale we must see that burdens are shared equally by all.

War on the modern scale we now know has disturbed our normal economic structure so greatly that, irrespective of the side which wins, the aftermath of the struggle prostrates both the conquered and the conqueror. To war's aftermath we must give such thought and make such plans that we shall not suffer again what has become as burdensome sixteen years after the war as at any time during the war. From my experience, I am convinced that it is quite possible now to arrange plans that will make the transition from peace-industry to war-industry without serious disruption, to carry on the industrial activity of war with the least possible harm to civilian morale, to accomplish all in the economic struggle that we shall ever need to accomplish, and lessen the after-effects of major conflict.

There are sequences that attend every major conflict and I cannot better state this than to quote from previous documents on this subject—(1) Shortages of services and things develop rapidly. (2) Competitive bidding among the procurement agencies of government and, in the last war at least, other procurement agencies, and for the civil population send all prices into a rapidly ascending spiral. (3) Expenses of government multiply. The abnormal need for money requires vast issues of government indebtedness. The inherent threat of destruction of government impairs national credit. The combination of all these things rapidly debases the exchange value of money thereby still further increasing the prices of things. The consequent destruction of buying power in the markets of the world begins almost immediately to impair the economic strength of the nation in the conflict. This sapping of economic strength will, in future wars, be the determining cause of defeat.

This process intensifies as time elapses with the following inevitable results: (1) Destruction of domestic morale through a just and bitter resentment by soldiers, their families (and indeed by all persons of fixed income) at the spectacle of grotesquely exaggerated profits and income to those engaged in trade or in services for sale in competitive markets and the constantly increasing burden of bare existence to all those who are not so engaged. This is the greatest source of complaint of "unequal burdens." The present demands for "equalizing burdens" and "Taking the Profit out of War" both go back to this single phenomenon of war inflation. There is no more important problem to solve—whether we consider it purely as a means to maintain the solidarity and morale of our people, or as the basis of our economic strength for war purposes, or to avoid war's aftermath of economic prostration, or on the broader grounds of humanity and even handed justice. (2) The inflationary process affords opportunity to individuals and corporations to reap profits so large as to raise the suggestion of complacency if not of actual hospitality toward the idea of war. That any human being could be persuaded, by prospect of personal gain, however magnificent, to invoke the horrors of modern war is almost unthinkable, nevertheless the certainty that war could never result in the enrichment of any man would give us all security and comfort. (3) Inflation enormously increases the cost of war and multiplies burdens on the backs of generations yet to come. The war debt of the nation is necessarily incurred in terms of debased dollar values. In the inevitable post-war deflation the debt of course remains at the inflated figure. Thus the bonds that our government sold in the World War for fifty-cent dollars must be paid through the years by taxes levied in one hundred cent dollars. For example, our total war expenditure was $39,000,000,000 incurred in terms of 1917, 1918, 1919 and 1920 dollars. In terms of the purchasing power of 1913 dollars it would have been only $13,000,000,000, or in terms of 1930 dollars probably not more than $15,000,000,000. Such a grotesque result would be almost unbelievable were the figures not living facts. If anything can be done to avoid this practical doubling of the economic burden of war certainly we should spare no effort to accomplish it. If anything can be done to prevent a collapse of our economic system such as has almost engulfed us, it should be done.

TODAY we are suffering from the economic, social and moral aftermath of the war. We try to catch up with it, to pay for it, to get rid of it, but after sixteen years, we are just seeing our way out. It is not our purpose to deal with it as it is at present but it is our purpose and your duty, if I may say so, to see that it does not occur again. There is one way to see that it does not occur and that is to control prices so that there will be far, far less profit in time of war than there is in peace time—none at all if that were possible. There is no difficulty about this. You are all familiar with the plans the War Department together with the War Industries Board has perfected, and which are now in the Department's keeping.

This is your task: to see that the armed forces of the country get what they want when they want it and that each man and each thing and every dollar takes its place in line, guided and marshalled to do its duty. If war comes, let us be prepared with a flexible machine that will enable us to carry on offensively and defensively. But men no longer can be asked to fight—indeed, they will not fight—if others remain at home to profiteer. The greatest legacy of a nation

after a war is that it has done its best, that it has fought for the right and that each one has taken his place and has borne his burden.

It is from the crucible of our World War mobilization that we have drawn the present War Department plans and the assembling of our economic forces to fight the depression. Indeed, we have all the beginnings of a war effort from an economic standpoint.

IT is not generally realized how embattled the world is. While it is true that the primary purpose of the present struggle is not to kill and maim, yet it has for its object the restriction of international commerce with immediate reactions upon the life and happiness of others. Except for the men under arms and fewer factories belching forth munitions, the world is as great an armed camp as it was in the World War. Each government sits behind a bristling fortress equipped with terrible economic weapons of destruction, instead of mere guns. Shells are not fired but peace, which means harmony, is even further away than if blood were shed.

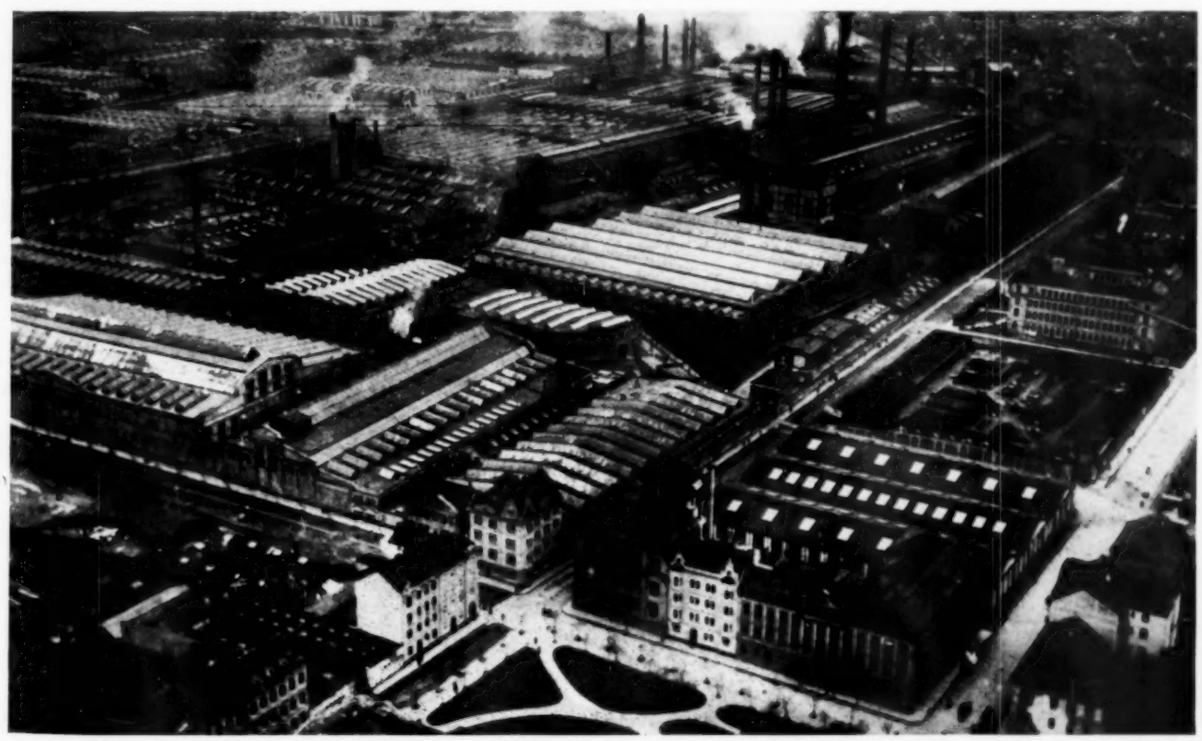
National economies are more highly organized than ever before, and all on the basis of offense or reprisal. They have their tariffs; their quotas of imports and exports, capital limited in its operations; currencies depreciated; exchanges controlled; debts repudiated; agricultural production restricted; business highly organized under governmental sanction; and barriers set up against establishing businesses and opening up enterprises in foreign countries, except in a very limited way. Airplanes and navies are being increased and from some far distant places, we can faintly hear the tramp of increasingly greater masses of men under arms. Surely in these circumstances you must study well the forces at work and be ready if the dreadful day comes to meet it.

It has been said that in the passing of dynasties of kings and princes who could make war there would be less chance of war. There already is established in the world, governments under dictatorship with powers greater than that possessed by any of the modern princes before the World War. Any of these can declare war overnight and proceed with tyrannical power to achieve world dominance, or meet downfall, without any expression of their peoples through legislatures. There is no doubt that peaceful as may be their intentions and their avowals, either Stalin, Hitler or Mussolini can plunge the world into a war that could not be localized.

There is small comfort to those who view the present embattled economic state of the world. Each nation seems to have its financial, industrial, agricultural and moral forces thoroughly mobilized for the restriction of the others. Yet I feel hopeful that this very situation—a world bristling with economic armaments—will soon bring home to the nations the necessity of sitting down together again and reëstablishing some fair relationships, so that men and women may carry on their lives and bring others into being, each with a decent regard for the rights of all.

That can be done; it must be done, and in that better day this country will hold its place, as it does now, as the chief evangel of peace and its blessings.

In closing, I want to thank you for this opportunity of appearing before you to speak on a subject to which I have given so much thought and time. I repeat: that all should struggle for peace but if war should come, then the fundamental should be that it must be conducted so that there will be no profiteering and that each and every thing and dollar, and each man and woman shall share equally the burdens. Any profit incentive to war must be absolutely destroyed.



THE SKODA WORKS AT PILSEN, BOHEMIA. LARGEST STEEL AND MACHINERY PLANT IN CZECHOSLOVAKIA.

War of Tomorrow

Effects of Progress of the Past Twenty Years

By Charles E. T. Lull*

EVERY modern war has differed from previous conflicts as a result of scientific, economic and military progress. The revolutionary movements of the Eighteenth Century were followed, in the French Republican and Napoleonic Wars, by large armies of citizen soldiery. Development of the railway and telegraph led, in the American Civil War, to rapid strategic movements and unified control of widely separated forces. The extension of telegraphic communication was reflected, in 1870, by the decisive rapidity of Germany's mobilization. The development of flying, the expansion of industrial undertakings, the growth of chemical industry and super-organization in commerce presaged, for the World War, the use of aviation, stupendous expenditure of ammunition, the appearance of poison gas, and staff control of the greatest military forces the world had ever seen.

The result of such an evolution has been to give to warfare an ever changing physiognomy. Where belligerents have anticipated correctly the nature of an approaching conflict and succeeded, by preparation, in meeting its requirements, they have enjoyed initial advantage of decisive influence on the outcome of hostilities. Where nations have gone into war failing to read the handwriting on the wall of progress, they have courted disaster and, almost invariably, have reaped it.

But war, in the final analysis, is a struggle between men; and there can be no greater danger to a belligerent than to misinterpret the spectacular evolution of its physiognomy as a change in its fundamental principles. New weapons may be substituted for old, former limitations may be overcome and new agencies appear, but the fate of battle will be decided in the future as in the past, in the shock of infantry, by the numbers, endurance and fighting spirit of men.

The human factor remains unchanged from generation to generation. Throughout history, men in battle have reacted in the same way to similar physical and psychological conditions; and the fundamental principles of war, which depend on human nature, are the same today as in the days of Rome or of ancient Chaldea. Unchanged they will remain as long as men are made in the image of their fathers. If, therefore, we would predict the nature of tomorrow's war, the human factor must be considered in its true relation to other conditions. Let us examine, then, into the general trend of progress and of military developments since the world's last great conflict, and study their combined effect in the light of war's unchanging principles.

IN the field of general progress, an element of spectacular advance since the World War has been that of automobile transportation. In the eleven years from 1917 to the peak of prosperity in 1928, the automotive industries of this country increased their output by one hundred and fifty per cent. There was a corresponding increase in the number of cars on roads and the speeds at which they were operated; and motor freight and passenger service became an active competitor of the railway. A development of particular significance from the military point of view was the emancipation of motor vehicles from highways. With caterpillar tracks and special pneumatic tires, cross-country travel was made practicable, even for heavy trucks at comparatively high speeds.

Closely allied to the advance in motor transportation has been that in large scale construction, particularly of highways. In the last decade, dirt roads in the United States and in Europe have been replaced by hundreds of thousands of miles of hard-surfaced highway which permits of smooth motor travel for great distances and is adequate for the heaviest peace-time traffic. The requirements of road and building construction have been met with mobile equipment of heavy capacity for the excavation of dirt, the mixing and pouring of concrete and erection of heavy material. Hard-surfaced roads may now be constructed and repaired quickly with little or no interruption of traffic.

Another development of importance from the military point of view has been that of radio transmission. In the days of the World War, wireless transmission was practically confined to telegraphic codes; and while there were many amateur stations, radio as a public service was limited to marine work and long distance telegraphy as a supplement to submarine cables. During the war, voice transmission was perfected. Today, there is a radio receiving set in almost every home. Equipment is manufactured in great quantity and at moderate cost.

OF tremendous significance, of course, is the development of aviation, both military and commercial. At the end of the World War, the commercial features of this great element amounted to little or nothing, all energies having been bent on its military application. Since 1919, however, its development has progressed at a phenomenal rate. In the United States, for example, there were manufactured, in 1929, more than twenty times as many airplanes as in 1921. Improvement in design has kept pace with production, as have the growth of air transportation and achievement in flight. One by one, the world's great obstacles have been overcome. Every ocean has been crossed, both poles have been attained and man has looked down upon the towering crest of Mount Everest. Lighter than air craft have carried passengers around the globe and conquered the stratosphere. In all the leading countries equipment has attained a high state of perfection. In commercial aviation, however, the United States is far in the lead.

Motor transportation, construction methods, radio transmission and commercial aviation all have direct application to military activity, as have many other specific developments of industry. Certain industries as a whole have a vital, if less specific influence on the way war is conducted. Among such are the chemical and metallurgical industries, and the great extractive industries of agriculture, mining and petroleum.

Chemical industry is dependent on the availability of

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raw material, and on a country's degree of industrialization, population and domestic requirements. It depends, also, on heavy capital investment and on a source of skilled artisans that only time can bring into being. It is seldom sporadic in its growth; but, once established, tends to persist as a national activity. As a result of these conditions, there is a marked difference in the chemical capacity of nations. The greater Powers are, as a rule, better equipped than the smaller ones; but between nations of equivalent commercial strength, there is a marked disproportion in this great industrial field. When the World War broke out, Germany's chemical capacity was greater than that of France and Great Britain combined. The United States, since 1914, has trebled its chemical industry and assumed world leadership followed, in order, by Germany, Great Britain and France.

WITH the growth of chemical industry in the last decade there has been a corresponding development in chemical research. This has brought many valuable products and processes into use. Notable results have been the fixation, on a commercial scale, of atmospheric nitrogen, with a corresponding emancipation from sources of mineral nitrates, and the adaptation of the processes of smokeless powder manufacture to the production of enamels, textiles and protective materials of commerce, building up, thereby, strong industries adaptable to the production of munitions in war.

The metallurgical industry follows so close in the wake of national prosperity that it often serves as an index to prosperity itself. Developed to meet at all times the peak demands of commerce, it is seldom, if ever, that its output approaches capacity. As a result, the industry as a whole has an enormous capacity of expansion. Metallurgical research, in the last fifteen years, has made remarkable progress in the improvement of materials already in use and the substitution of new metals for old. As a result, materials formerly "strategic," that is to say procurable only from foreign sources, have been replaced by materials of domestic origin. Thus, the capacity of domestic material to meet requirements in peace and in war has been increased.

In the extractive industries of agriculture, mining and petroleum, the most significant development since 1918 has been the enormous increase in the capacity of production, far beyond the needs of consumption; an increase which has led to the dropping of prices and artificial curtailment of output.

Viewing industrial progress in general, as it has taken place since the World War, it would seem that, should a major conflict develop tomorrow, the armies of a great Power, and those of the United States in particular, could count on greatly increased mobility of troops and material, far greater importance of aërial warfare, facilities for rapid, finished construction of engineering works formerly improvised at great expense of time, labor and man-power, greatly increased rapidity and efficiency in transmission of orders and information, capacity for almost unlimited chemical operations, capacity for greatly increased expenditure of munitions, and greater independence than in former conflicts of foreign sources for the vital needs of war.

IN the field of military progress, the most spectacular development since the World War has been that of aviation. In 1914, the airplane as an instrument of war was practically unknown. None of the belligerents had sufficient aircraft, in early operations, to play a significant role. Used at first for observation only, the airplanes of opposing sides functioned without weapons and made no effort to oppose one another's operations. In the course of the war, they developed a certain amount of fighting power and were specialized to meet the requirements of observation, bombing and pursuit. Rapid strides were made in design; but in comparison with what has been achieved since 1918, aviation can hardly be considered as having passed the experimental stage when the war ended. While it exercised a profound influence on tactical methods through the element of aërial observation and demonstrated the moral effect of its destructive powers, as an offensive weapon against troops or even against the material of enemy communications, aviation never developed the effectiveness that its powers would seem to have justified.

Since the war, military aviation, like its commercial counterpart, has made a remarkable advance. Speed, flying endurance, climbing ability and all the characteristics necessary for military purposes have been improved. Capacity for aërial combat and for offensive action against troops and material on the ground is out of all proportion to what it was in the World War. Should war break out tomorrow, all the great Powers, other than those forbidden by treaty stipulation to maintain military aviation, would be provided, at the beginning of hostilities, with powerful, well balanced air forces.

In any discussion of military aviation, due attention must be paid to the compensating element of antiaircraft defense. Antiaircraft weapons in the World War never passed the stage of initial experimentation. Matériel was largely improvised from weapons designed for other purposes. Fire direction depended on crude improvised methods and devices. Not until the last few months of hostilities were any batteries provided with any semblance of reliable fire-control equipment. Nevertheless, these weapons were effective, where installed, in driving aviation to such altitudes as to be unable to effect deliberate destruction of targets under protection. Since the war, great strides have been made in the development of antiaircraft weapons and fire-control equipment. With its present ranging power and accuracy, antiaircraft artillery will command a respect which air forces cannot ignore and, where adequate for its defensive missions, will play a role which must be taken into account.

In all arms of the military service, the keynote of development since the World War has been that of increased fire power and mobility. Infantry and cavalry have leaned more and more to automatic weapons. Artillery has increased the range and flexibility of its fire. Motorization has been adopted wherever practicable for rapid movement on, and freedom of movement away from, highways. A development of great significance is that of armored vehicles able to move at high speed on roads or across country, and capable, owing to high mobility, endurance and fighting power, of independent action never before attained.

WE come now to an item of great significance in the consideration of any future conflict, that of chemical warfare. One of the earliest known means of combat, the chemical weapon reached a high state of development in the days of the Byzantine Empire, but disappeared almost entirely with the introduction of gunpowder. It reappeared in the World War and developed with phenomenal rapidity under the impetus of modern science. Since the war, research has been continued for new chemical warfare agents and more effective

means of dispersion. Few if any substances have proven superior to the agents in use when the war ended, but the means of dispersion have been greatly improved. One development of particular significance is that of dispersing chemicals direct from aircraft.

Chemical warfare has been retarded in its advance since the World War by repeated efforts to abolish it through international agreement. Treaties for this purpose have been negotiated, but have failed through the unwillingness of governments to ratify the action of their plenipotentiaries. It is a significant fact that the United States, today, is bound by no commitment, whatsoever, to refrain from or limit chemical operations in war; nor is any other Power bound to refrain from or limit chemical operations against the United States. Each government realizes the practical certainty that chemicals will be used, but, as a gesture of good faith, manifests an intention to refrain therefrom until moved to retaliation by acts of the enemy.

Paradoxical as it may seem, it is this very effort to abolish it by treaty agreement that gives the chemical weapon its greatest potential strength; for it adds to its natural effectiveness the powerful element, surprise. The surprise effects of Germany's quick mobilization against France in 1870, of Japan's attack on Russian battleships at Port Arthur before the Russians were aware of any declaration of war, of Germany's sweep through Belgium in 1914, and the initiation of gas warfare in April of 1915 were all made possible by the provisions of treaties or the common interpretation of international custom. The present international situation in regard to chemical warfare affords an opportunity for just such a blow with crushing disadvantage to the side which has trusted in peace-time agreements for protection in war.

WITH the foregoing view of the trend of world progress, industrial and technical, civil and military since the world's last great conflict, let us now undertake to visualize their combined effect in the light of war's most important element, the element of man power.

Shortly after the World War, an officer high in the military councils of the French Government expressed the following concept of the next great European conflict. "In my opinion," said the General, "the next war will reflect, in its character, the movement toward international disarmament and reduction of standing armies. Its opening phase will witness operations of comparatively small forces, in open warfare, covering the *levee-en-masse* of national mobilization. Once belligerents are mobilized, military operations will resemble those of the World War."

The lessons of war are quickly forgotten; but one lesson of the last conflict, its ghastly toll in human life, will be remembered for generations to come. No nation will willingly repeat the World War's cost in man power; nor will troops be sacrificed where the same objects can be attained by mechanical means and expenditure of material. The magnitude and rapidity of a country's initial mobilization for war are governed by the size of its population, the size and organization of its peace-time army, the classification and military training of its citizens, and the readiness with which it can assemble the material sinews of war. In Europe, today, certain States are denied by treaty stipulation the right to maintain large standing armies or develop the peace-time structure of national mobilization. Other States, untrammeled by treaty restrictions, are as well prepared for mobilization as they were in 1914. These latter nations have repelled every suggestion of land disarmament, supporting their attitude on the plea of security against the very States which are now disarmed. Nor is their contention as unreasoning as it may seem.

The Allies of the World War and the small buffer States they have created are the natural defenders of the *status quo*. They now enjoy, at the expense of former enemies, advantages they can never hope to enlarge and whose greatest safeguard lies in the maintenance of European peace. Should war break out tomorrow, it is the losers of the last war, therefore, who would be the logical aggressors. Denied a peace-time basis of national mobilization, they would have to depend on comparatively small forces of maximum combat efficiency. As aggressors, they would establish a keynote of tactical operations to which their opponents would be forced to conform. As hostilities progressed, the strength of armies would inevitably increase; but it is extremely doubtful if they would ever reach the magnitude attained in the World War.

Any major foreign war of the United States would involve oversea transportation of our own forces or those of the enemy, or deployment on wide frontiers of the troops of countries maintaining small peace-time establishments. Unless, therefore, we should repeat the procedure of 1917 and 1918, in which the American armies served merely as a reinforcement to great national armies already in the field, such a conflict would begin, of necessity, with forces of limited strength in extended theatres of operation. The same is true of the British Empire, except for England's possible intervention in Europe in alliance with Continental Powers.

One element which must not be overlooked is the increased demand for labor in war industry. After the First Battle of the Marne, exhaustion of munitions brought active hostilities to a standstill. Both sides realized that the war would be of much longer duration than had been anticipated, and that enormous quantities of munitions would be needed. The armies dug in and entered on a campaign of trench warfare which became the outstanding characteristic of the World War. It was then that the demands of industry in man-power became evident. France, with no expectation of any such condition, had put every available man into the field; and it became necessary to reverse the process of mobilization by recruiting men from the army to fill the ranks of newly created war industry. Great Britain, with the problem of recruiting an army of Continental proportions, was seriously embarrassed by conflict of military and industrial needs. Throughout the war, in both countries, the problem waxed in gravity as battle exacted its toll and the demands of industry grew.

The entry of the United States into the war threw increased burdens on Allied industries and aggravated their demand for man-power. To meet the requirements of the A. E. F., and effect vital economies in ocean transportation, it became necessary to procure equipment, munitions and supplies from Allied sources. As an essential condition of such procurement, the Allies demanded replacement in so-called "raw materials," of our inroads on their limited resources. The replacement material was not true raw material, however, but rather "material in process" in which the material factor was negligible in comparison with that of already expended labor. It amounted, in fact, to a contribution of skilled man power, converted into material form.

The demands of industry in any conflict are difficult to

determine in advance; but it is safe to assume, with the developments of the last two decades, that they will be greater than ever before. The wise nation, therefore, will make substantial allotments of man power for industrial needs, even to the extent of curtailing the initial strength of its armies in the field. The nation as a whole must stand, more than ever, behind its armies and support them; but the day of the *nation* literally *in arms* is past.

The World War was characterized by the deployment of enormous numbers of troops on fronts corresponding to national frontiers. The main forces were concentrated forward in impenetrable battle-lines which evolved into great labyrinths of trenches. Battle was practically continuous and, although limited in intensity except in time of major operations, exacted its daily toll in lives and munitions, with a gradual wearing down of strength and morale. A war of attrition was carried on with a succession of minor combats and limited objective engagements for no strategic purpose other than to sustain the fighting spirit of troops and break the endurance of the enemy. The system as a whole was a natural consequence of the enormous number of troops in the field. Once in being, its requirements could be fulfilled by nothing short of the nation literally in arms.

IN the war of tomorrow, we may expect hostilities to begin with much smaller forces; but strategic fronts will be the same, for they are controlled by geographical conditions which remain unchanged. On the Western Front, the bulk of the armies was always immobilized by virtual contact with the enemy. Combat forces withheld from the front were limited to troops in training, units withdrawn for recuperation, and the few divisions that could be spared for strategic reserve. Major offensives could be launched only by weakening certain portions of the front to provide divisions and artillery for concentration at the point of attack. With smaller forces dependent on increased mobility to compensate for diminished numerical strength, such a system would be suicidal. In contrast with the World War, the next great conflict will see armies withdrawn from habitual contact with the enemy in order to preserve their liberty of action. Attrition will be eliminated as a major instrument of strategy, and battle for decisive effect with all forces available will become once more the main object of military operations.

In the future, as in the past, the primary purpose of strategy will be to cripple the armed forces of the enemy and destroy their power to resist. The offensive will depend, more than ever, on the element of surprise and on its ability to launch an attack and push it to a successful conclusion before the enemy can assemble the forces for effective resistance. Time will be the determining factor and will dominate all other considerations. Delay incident to enemy reaction must be minimized by protective action of covering forces and aviation; but essentially by operations so planned and executed as to attain their objectives in spite of anything the enemy can do. Accurate intelligence will be of vital importance.

In the World War, with every part of the front under constant, systematic observation, surprise was sought primarily in secrecy of preparation. To avoid detection by enemy aviation, troop concentrations were effected during the hours of darkness and every effort was made, by day, to preserve the normal appearance of a quiet sector. Night movements, especially in forward areas, will still be necessary, though less effective than formerly owing to aviation's improved facilities for night observation. But with greatly increased mobility, rapidity will tend to displace secrecy as an instrument of surprise, and we may anticipate bold daylight movements up to within the very zone of combat operations.

Defense differs from attack in that the defenders, unable to control the time, place and conditions of combat, must conform to the initiative of their opponents. To avoid the disaster of surprise, they must have timely knowledge of the enemy's movements and intentions; whence, as in the offensive, the vital need of efficient military intelligence. Plans must be prepared for all eventualities that can be foreseen so that, at the critical instant, troops may converge on any threatened part of the front and deploy for resistance. The defender will be at a disadvantage in the race for time, and, even to a greater extent than the assailant, will have to resort to daylight movement.

In the concentration and deployment for attack or defense, there is a forward limit, however, beyond which motor transportation of infantry will be impracticable. As troops enter the zone of enemy artillery fire, they will have to depend upon themselves. Rapidity of movement must now be sacrificed for concealment, and conditions will respond more and more to the limitations of strength and endurance. At this point, each arm and service will enter into the role dictated by its own peculiar characteristics; and on the immediate field of battle we may expect armies to maneuver and fight much as they did in the World War. Once engaged, they will carry the battle to its logical conclusion. The offensive will continue until its strategic objectives, if limited, have been attained or abandoned, or until further progress will exact a greater cost than its advantages warrant. Then, unless the enemy undertakes an offensive return, operations will come to a standstill.

Troops, under conditions of modern warfare, will then be in need of recuperation. Material will be depleted and in need of replacement. Armies, in forward concentration, will be practically immobilized for any maneuver other than to drive forward or withdraw; and it will be to the manifest advantage of each side to regain its liberty of action by withdrawal from immediate contact with the enemy, leaving the battle-line once more in charge of covering detachments.

AS in every system of war, the role of each element will respond to its own powers and limitations and to the demands of the general situation. The covering forces, in addition to their normal task of security, must be capable, in the offensive, of seizing and holding advanced positions from which the main attack can be launched; on the defensive, of holding positions critical to the defense. As long as these forces maintain their advanced centers of resistance and power to operate offensively against the enemy's flanks and communications, they can delay and limit penetration in the intervals between. To fulfill these missions, the covering forces must be provided with a weapon of powerful fast-moving tanks and armored cars working in intimate coöperation with aviation, and mounted troops capable of rapid movement and stubborn resistance supplemented by infantry of reinforcement in motor transportation. With artillery adapted to the characteristics of the elements it must support, we have the specifications of a typical modern mechanized cavalry division, the ideal organization for the covering missions of tomorrow's war.

The outpost centers of resistance, in such a system, need

not possess within themselves all the means necessary for offensive action; but will fulfill their purpose if, as heads of protected approach, they enable forces to reach the front for offensive maneuver. These centers will naturally become objectives of enemy attack and must, therefore, be strengthened by fortification and possess the best obtainable communications with the rear. Rapidity of construction and installation will be essential and will call into use the latest methods and equipment of concrete and highway building.

In the World War, every major offensive was accompanied by heavy movements of troops and material on both sides. In the next conflict we may expect such movements to be greatly intensified with the exploitation of every facility that modern transportation and radio communication can place at the disposal of the armies. Troop movements by motor transport, in 1918, were effected at the limited speeds of five or six miles per hour, and rarely exceeded the rate of ten miles, thus hardly exceeding the marching rate of good cavalry. This was due in large measure to difficulties of traffic control, but primarily to limitations of motor transport material. With the progress of the last fifteen years in automotive transportation, such limits of speed are inconceivable. Probable rates of movement of from twenty to thirty miles per hour are rather to be anticipated.

It is while troops are in movement that they are particularly sensitive to aërial attack. In the World War, as already noted, the offensive action of aviation against ground forces, and even against the material of enemy communications fell far short of such accomplishment as would seem to have been within its capacity. This was undoubtedly due in large measure to the shortage of aircraft and the need of conserving resources for vital missions in immediate support of ground forces. Today, however, all great Powers, other than those restricted by treaty stipulation, are armed with powerful peace-time air fleets which would be immediately available on the outbreak of hostilities. Aviation material, since 1918, has been developed with the attack of ground forces and the destruction of ground targets as one of its primary purposes. The effectiveness of such operations, in the face of enemy resistance, is something which only the test of war can reveal; but it would be the height of folly, in the light of progress, for any commander to ignore the danger of aërial attack against the ground forces, or fail to provide protection at the instant of greatest jeopardy when rapidity of concentration for attack or defense may be a decisive factor.

Antiaircraft artillery, and the antiaircraft fire of units in their own defense are far more effective than in 1918, but are still limited as a protection against attack and bombing aviation. Effective protection against enemy aircraft demands a proper coördination and teamwork of pursuit aviation, which alone can contest command of the air, with the antiaircraft defenses. When concentration begins, therefore, troops must depend in large measure upon their own aviation for protection against the aviation of the enemy; and it is at this instant that the air forces of both sides will play their most critical role.

In preparing to launch a major offensive, the most important service a commander-in-chief can demand of his aviation will be to protect the ground forces in concentration from aërial attacks of the enemy. Next in importance will be the mission of impeding and delaying the enemy in his deployment for defense. Of ever increasing importance, as the operation progresses, will be the missions of intelligence and of coöperation with ground units in the functions of reconnaissance and combat. On the part of the defender, the missions of aviation are substantially the same; but the order of importance is reversed. Here the vital need is to disorganize the assailant's forces and delay their concentration long enough to enable the defense to build up an effective resistance. The first essential for successful execution of these missions will be to gain the mastery of the air; and a characteristic feature of tomorrow's war will be the bombing of airdromes and aërial combats which may be expected to herald the launching of major operations.

Recent developments in aviation and its growth have been so spectacular as to give rise to a popular conception of the next war as one which would be fought in the air with operations directed against civil populations and establishments rather than against military forces. Aviation, from its nature, is particularly qualified for distant strategic missions and raids against the industrial and political centers of an enemy. Against a small State with its industry highly centralized, such raids might, conceivably, cripple military activity and be of decisive effect, but would involve heavy losses on the part of the raiders. But against a country of great industrial capacity, with widely distributed centers of commercial and political activity, their strategic effect would be negligible and, certainly, would not warrant their cost. It is extremely doubtful, therefore, if, in a war between first class Powers, any such operations would be undertaken as long as decision hangs in the balance; for the wise commander-in-chief will avoid dissipation and the risk of crippling his air forces and will hold them in leash against the instant when command of the air is of vital necessity. When the outcome of hostilities is no longer in doubt, aviation may be used to exploit success by raids calculated to break down the enemy's will to resist. At every instant, however, its part in the general strategic plan will require close coördination with that of other elements; whence the vital necessity of unified control.

In the foregoing study, we have undertaken to form, from indications of today, a picture of the world's next great conflict. The picture as a whole is characterized by armies smaller than those of the World War, and a tendency to depart from the principle of the nation literally in arms. War for attrition is abandoned, and battle for decision becomes once more the primary object and instrument of strategy. Armies, no longer immobilized by forward concentration in virtual contact with the enemy, are withdrawn for freedom of action, under security of covering forces, to a distance from which they can converge on any part of the front for offensive action or to meet the thrust of the enemy. Strategic surprise is still, as in the past, the determining factor in major operations. Mobility becomes the keynote of maneuver with every resource of modern progress exploited for its attainment. At the critical instant, when movement begins, all other considerations will be subordinated to that of winning the battle at hand. At this instant, when troops in movement are in greatest jeopardy of aërial attack, the air forces of both sides will enter into the role of their most important function and will throw all their resources into the battle for command of the air. It is at this instant that the greatest need will arise for close coördination between all combat arms and services in (*Continued on page 117*)

The Story of The Confederate Colt

—*To the Memory of E. Berkley Bowie*—

By Richard D. Steuart*

THE individual who undertakes to gather data about the arms industry in the South during the War between the States has a man's sized task cut out for him. The reasons for this are several: In the first place, the few ordnance records of the Confederacy that survive are fragmentary and widely scattered. Most of them are in State and private libraries. The next best source material that awaits the researcher is the files of the daily newspapers. These, too, are widely distributed and woefully incomplete. And in dealing with such technical matters as arms and ammunition, newspapers do not always speak with authority. The reporter usually wrote what was told him, and ofttimes his informant was overenthusiastic. Thus, for instance, whenever you find a mention in the Confederate press of a new revolver invented or manufactured in the South, it is always described as equal or superior to the Colt. This is interesting as showing the high esteem in which the Colt was held throughout the South, but it is seldom a fair and an impartial estimate.

As for the testimony of survivors, this is so unreliable as to be almost a hindrance, instead of a help. The officer[1] in command of the reserve ordnance train of the Army of Northern Virginia once told the writer he never saw a Confederate-made revolver and did not believe there was such a thing. And hundreds of Confederate veterans were willing to swear that smallarms were made at the Tredegar Iron Works, Richmond, Va., although we know this is *not* true. Machinery for the manufacture of smallarms was made there, but not the arms themselves.

These things are mentioned merely by way of introduction and to show the difficulties presented the historian. The critical reader may find many gaps and discrepancies in the narrative that follows, but, at least, it will do until a better informed narrator undertakes to tell the story.

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To start at the beginning, which is the conventional starting point, we must go back several years before the war and to a Northern city. In Cincinnati were two men—Abel Shawk, of Pennsylvania Quaker parentage, and Charles H. Rigdon. Both were engaged in peaceful pursuits. Shawk was an inventor and maker of steam fire engines. Rigdon was a member of the firm of Rigdon and Harmsted, scale manufacturers. Both were mechanics of a high order.

FIG. 1. SHAWK & MCLANAHAN REVOLVER, ST. LOUIS, 1858-60.

Cal. .36, 8-inch barrel, brass frame; rifled 7 grooves right; some have on butt strap: "Shawk & McLanahan, Carondelet, St. Louis, Mo." Others have serial only.

Shawk sold one of his fire engines to St. Louis in 1855 and went there to demonstrate it. Rigdon had preceded him and started a scale factory in North Main street—the St. Louis Scale Manufactory. Rigdon was employed as engineer of the fire engine when occasion demanded. In 1858 Shawk petitioned the authorities of Carondelet, a suburb of St. Louis, to help him establish a factory for the manufacture of locks and fire engines. A plant was established there under the firm name of Shawk & McLanahan.[2] And it was while there that Shawk invented a rifling machine and started out to manufacture revolvers on a small scale. The result was the much-prized Shawk & McLanahan revolver. (Fig. 1.)

It is entirely possible that Rigdon had a hand in the manufacture of these weapons, as he and Shawk were friendly. In any case, it is likely that both Shawk and Rigdon were largely influenced by the popularity of the imitation Colt revolvers sold by H. E. Dimick, noted gunsmith of St. Louis. These revolvers bear Dimick's name, but they probably were made for him by the Metropolitan Arms Company, which made imitation Colts until the Colt firm stopped them. (Fig. 2.)

In 1863, Shawk, after failing to get a contract for the manufacture of muskets for the Union army (he was no Confederate sympathizer) sold his plant in St. Louis and re-

1 Lieut. Joseph Packard.
2 J. K. McLanahan also was a Cincinnati man.

turned to Cincinnati, and thus he passes out of our picture.[3] The plant, it is said, was used for the repair of Army muskets. Dimick, being more fortunate, got a Union contract.[4] But we are getting a little ahead of our story.

AT the outbreak of the war there was not a revolver-making plant in the South, except the Shawk & McLanahan shop and whatever machinery for that purpose Rigdon had in the same city. The capture of the United States arsenals in the South by the State authorities brought the Confederacy only a lot of flint and percussion holster pistols, more useful as clubs than as firearms. Throughout the South were many gunsmiths and arms dealers. Among them were such well-known firms as Hyde & Goodrich of New Orleans, T. W. Ratcliffe, of Columbia, S. C.; Courtney & Tennant, of Charleston, S. C.; and Samuel Sutherland of Richmond.

FIG. 2. DIMICK "COLT," 1857-60.

7½-inch barrel, cal. .36, rifled 7 grooves right. Marks: "Made for H. E. Dimick, St. Louis" on top of barrel. Serial on various parts.

Their business was chiefly to retail and repair arms. They brought fowling pieces, rifles, revolvers, pepperboxes and deringers from the North and shotguns, rifles and revolvers from England. In many instances the manufacturer stamped the dealer's name on these pieces. English arms exporters also did this, and that is why we find English Tranter revolvers, and pepperboxes, deringers and revolvers made in the North bearing the names of Southern firms. Some of these arms dealers, of course, were experienced gunsmiths, like Sutherland of Richmond, but their arms-making activities were confined to turning out a few fine rifles and dueling pistols for the landed gentry.

At the very outset of the war the South had no trouble placing orders for arms with Northern manufacturers. Through its business relations with the North, the Tredegar Iron Works placed orders for revolvers with the Colt company at Hartford and other firms.[5]

One of the first things the Confederate Government did was to encourage home industries by subsidies. On January 13, 1862, Congress passed an act providing for an advance of 50 per cent of the capital of any firearms manufacturing company. President Davis vetoed the measure because he considered some of its features objectionable and because, he said, power to advance one-third of the capital already existed.[6] On April 19, 1862, however, another measure of similar import was signed by President Davis.[7]

The South, in its dire straits for arms, also turned to the battlefields. Secretary of War Randolph approved an order May 20, 1862, detailing squads and wagons under ordnance sergeants to gather up arms from the battlefields. The reserve ordnance train of the Army of Northern Virginia carried these arms to Richmond and returned with ammunition for the army. These arms, many of them broken and twisted, were made over into serviceable weapons. This provided work for hundreds of mechanics.

That the South was so well supplied with arms during its four years of warfare is largely due to the energy and genius of two men—Gen. Josias Gorgas, Chief of Ordnance, and Col. James H. Burton, master armorer. Burton had been Acting Master Armorer at Harpers Ferry in 1853 and a year later was Master Armorer. About 1854 he went to England to superintend the work of remodelling the great Armory at Enfield and the installation of American machinery. Then he was engaged in experimenting with the Model 1855 rifle at the Pikesville Armory, near Baltimore. In the latter part of 1860 he was engaged to superintend the execution of a contract by J. R. Anderson & Company (The Tredegar Iron Works) for making new rifle machinery for the Virginia Armory at Richmond. On January 14, 1862, Burton was commissioned Superintendent of Armories in the Confederacy.[8]

Throughout the South many companies were organized in an effort to obtain the Government subsidy. Many of them never got beyond the paper stage. In this class belong the Memphis Arms Company, Thomas McNeill & Company and Charles W. Alexander. In some instances patents were obtained. Alexander got a Confederate patent for a breech-loading carbine, but none except the model was made. In other instances model revolvers were painstakingly turned out by hand for submission to the ordnance officers, but they failed to pass the test. Schneider & Glassick of Memphis probably belong in the last-mentioned class, as witness this news item:

"Memphis Manufacture. We were yesterday shown by Messrs. Schneider & Glassick, of Jefferson street, between Front and Main streets, a six-shooter Navy pistol of their own manufacture. It is a beautiful weapon, not inferior to the Colt's make in any particular. The finish of the whole, the accuracy of the parts and the excellent working of the mechanism are admirable. Iron, brass work and wood work are all specimens of skill. We are proud that Memphis can turn out such splendid workmanship."[9] But Schneider & Glassick were never heard of after the fall of Memphis, so their pistol-making activities must have been short-lived.

PERHAPS the earliest record of pistol making in the Confederacy is to be found in General Gorgas' report of August 12, 1861, wherein he says that a contract had been awarded for 5,000 Le Mat revolvers (of which more anon) and that another contract for 5,000 "pistols" had been given to Edward Want of Newberne, N. C.; delivery to begin in three months.[10] Newberne was captured by the enemy on March 14, 1862, and the writer can find no record of any actual manufacture by Want, who seems to have disappeared completely. It should be noted that Gorgas, in speaking of the Le Mat contract, refers to "revolvers" and, in the next paragraph, in mentioning the Want contract he calls them "pistols." While Gorgas often used the generic word pistol to designate a revolver, it is evident that in this case he meant just what he said—single-shot pistols.

3 Shawk died in 1873.
4 Dimick contracted to make 1,000 sharpshooter rifles with sabre bayonets.
5 Bruce's History of Iron Manufacture in Virginia in the Slave Era, p. 346.
6 Acts of the Confederate Congress, Vol. I, pp. 477, 753, et al.
7 Acts of the Confederate Congress, Vol. II, p. 147.
8 Acts of the Confederate Congress, Vol. I, p. 671.
9 *Memphis Daily Appeal*, Dec. 8, 1861.
10 Official Records, War of the Rebellion (hereafter referred to as Off. Rec.), Part IV, Vol. I, p. 556.

One of the first firms we have to consider in studying the revolver-making industry in the Confederacy is that of Robinson & Lester of Richmond. Samuel C. Robinson in 1860 owned and operated the Belvidere Planing Mills, in Richmond. Early in 1861 Robinson and Lester got together to start a revolver plant. A building was leased on the south bank of the canal near the Petersburg railroad bridge. Robinson seems to have been the purse and brains of the enterprise. Lester was the practical mechanic and foreman.

The Richmond Daily Examiner of June 9, 1861, said the factory had been started and "good revolvers are soon to be made there." Nowhere, however, do we find the statement that revolvers have been made. On September 23, 1862, there was an alarm of fire at "the pistol manufactory of Robinson & Lester under the Petersburg railroad bridge," but the loss was said to be slight.[11] On April 27, 1861, Robinson wrote the Advisory Council withdrawing his proposal to furnish 3,000 army or navy pistols of Whitney pattern to be delivered in 60 to 120 days at $18 each and proposed to make them at $20 each. This offer was accepted.[12]

Early in 1862 Robinson turned his attention from revolvers to carbines. He organized the S. C. Robinson Arms Manufactory and began the manufacture of breech-loading carbines on the Sharps model. General Gorgas reported that from September, 1862, to September, 1863, Robinson manufactured 3,000 of the carbines, but that they were unsatisfactory and caused much complaint from the men to whom they were issued. General Lee reported that the carbines demoralized the men.[13] Gorgas said the trouble was that the cut-off was not gas tight. At any rate, the Government took over the plant late in 1863 and used it to manufacture muzzle-loading carbines until it was removed to Tallassee, Ala. And so, if Robinson & Lester made any revolvers, both the weapons and their record are lost.

And now we will return and look up Charles H. Rigdon, who was an ardent Southern sympathizer, who had gone to Memphis at the outbreak of the war, probably taking with him his revolver-making machinery. In Memphis he met Thomas Leech, erstwhile cotton broker, who had gotten the war fever and had started the Memphis Novelty Works to make swords for the Confederacy.[14] Just about that time, according to newspaper reports, they were setting up machinery in the Eagle Foundry of Streeter, Chamberlain and McDaniel, for the manufacture of Colt's revolvers.[15] This may have been Rigdon's machinery, but the advance of the Federal army put an abrupt stop to the manufacture of arms for the Confederacy in Memphis. General Beauregarde about March 31, 1862, issued an order for the armsmakers to leave the city.

It was in Memphis in the Spring of 1861 that the firm of Leech & Rigdon was organized. At first their endeavors seem to have been devoted exclusively to the manufacture of swords. On May 1, 1862, the firm advertised a lot of infantry and field officers' swords for sale at the Memphis Novelty Works, Main and McCall streets.[16] On Thursday, May 8, Leech & Rigdon announced: "All persons having swords left here for repairs are hereby notified to call for them today, as we are going to start for Columbus (Miss.) Friday morning." (Next day.)[17]

When Leech and Rigdon moved to Columbus, Miss., they took their machinery with them, an easy matter to float it down the river on barges. The firm remained in Columbus until December, presumably carrying on their sword-making operations. In December, 1862, the exigencies of war compelled another move. As the Federal cordon around the Confederacy began to tighten, the Southern officials ordered all arms plants concentrated in the interior, where they would be safe from enemy raids. And so Leech & Rigdon packed up again and moved to Greensboro, Ga.

Leech and Rigdon set up shop in Greensboro in January or February, 1863, and on March 6 of that year they were awarded a contract to make revolvers for the War Department. The result was the "Leech & Rigdon" revolver. (Fig. 3.) On July 12, 1863, George W. Rains, Lieut. Colonel in command of the Augusta (Ga.) Arsenal, wrote to Colonel Burton that he had been placed in charge of the pistol factory at Greensboro. Just how long Leech and Rigdon were engaged in the manufacture of revolvers at Greensboro is not known, but it must have been only about six months. The partnership was dissolved in the latter part of 1863, and General Gorgas in reporting the arms projects under way in November, 1863, makes no mention of the Greensboro factory, although he says that pistols were being made under contract in Columbus, Ga., Macon, Ga., and Atlanta. If we can assume that all the "Leech & Rigdon" revolvers were made at Greensboro between March 6 and November, 1863, it indicates that the output was about 200 a month. This is based on the fact that of all the "Leech & Rigdon, C. S. A." revolvers known to the writer, there is none with serial above 1200. The early ones were stamped on the barrel: "Leech & Rigdon." Later ones are marked: "Leech & Rigdon, C. S. A."

FIG. 3. LEECH & RIGDON "COLT," GREENSBORO, GA., 1863.

7½-inch barrel, cal. .36, rifled 7 grooves left. On top of barrel: "Leech & Rigdon, C. S. A." Serial on various parts. A few had no marks except serial.

In January, 1864, Rigdon organized a new firm in Augusta, his partners being Jesse A. Ansley, A. J. Smythe and C. R. Keen, operating under the firm name of Rigdon, Ansley & Company. They leased a building in Marbury street, near the second canal level, and on March 13 signed a water-power lease with the Augusta Canal Company. And there they must have manufactured the 12-stop revolvers that bear only the stamp "C. S. A." on top of the barrels (Fig. 4). But the firm had its troubles here. Ansley was conscripted for military service early in 1864. He was brought before the court on a writ of habeas corpus on April 19, but the court refused to exempt him. He appealed to the Georgia

11 Richmond *Daily Examiner*, Sept. 24, 1862.
12 Off. Rec., Vol. LI, Part II, p. 48.
13 Off. Rec., Vol. XXVII, Part 3, p. 873.
14 In the writer's collection is a curious cavalry sword, with long, straight, double-edged blade, marked "Memphis Novelty Works. Thos. Leech & Co."
15 Memphis *Appeal*, Nov. 15, 1861.
16 Memphis *Daily Appeal*.
17 Memphis *Daily Appeal*.

Supreme Court but again lost his case.[18] At the hearing on the writ, Captain Hudgins, ordnance inspector, testified that Rigdon, Ansley and Company were carrying out faithfully the terms of their contract with the War Department. Rigdon testified that the firm employed 60 hands and that Ansley's presence was indispensable to the business, but his plea was of no avail.

The mechanics of the Rigdon plant were organized into a defense battalion, for the munition makers of the South had to fight as well as work. They were known as the Rigdon Guards and were enrolled among the home defense troops of Augusta as Company C under A. J. Smythe as captain and Lieut. J. W. Poor. The Rigdon Guards took part in the battle at Griswoldville, Ga., on November 22, 1864, when they were called upon to help defend another revolver factory, and Captain Smythe and several of the revolver-makers were wounded. However, there must have been some fight left in them, because in the Augusta *Constitutionalist* of December 2, 1864, we find this notice: "Attention, Rigdon Guards! The members of this company who are cut off from their command, whether furloughed or detailed, will meet at the pistol factory on Friday morning at 9 o'clock to be organized for immediate home defense. By order of J. R. W. Poor, First Lieutenant, Company C, Augusta (Ga.) Battalion. J. M. Wood, brevet sergeant."

Meanwhile, the pistol-making industry of Rigdon and Ansley must have lapsed. It is possible that the machinery was boxed and shipped to Macon late in November, when the powder works and machine shops were dismantled.[19] However, as late as February 21, 1865, we find an order of General Gorgas directing Colonel Burton to assume supervision over the operations at the Macon, Athens, Columbus and Tallasee armories, "including the contract establishment of Rigdon & Ansley at Augusta."[20]

Of about 18 specimens of the 12-stop revolver known to the writer, the highest serial is 2330, which is in the Nunnemacher collection in the Milwaukee Public Museum. This would indicate that about the same number of 12-stop revolvers were made as Leech & Rigdon's.

The question may be asked: How can it be proved that the 12-stop revolvers were made by Rigdon, Ansley & Company? The answer is that such proof is difficult, but that all evidence points to it. An examination of the parts shows a marked similarity. Obviously, it was difficult to stamp the full name of the new firm—Rigdon, Ansley & Company—on the weapons, and so the simple "C. S. A." was used. This was evidently done with the same stamp used in marking the "Leech & Rigdon, C. S. A." revolvers. But the best evidence, perhaps, is that the serials of the Leech & Rigdon and the 12-stop revolvers do not overlap. The Leech & Rigdon serials stop at 1200; the lowest serial of a 12-stop revolver known to the writer is 1700. There may be higher Leech & Rigdon serials than 1200 and lower serials than 1700 on the 12-stop revolvers, but, so long as the serials do not overlap, the theory of a common origin holds.

Fig. 4. Rigdon, Ansley & Company Revolver Made in Augusta, Ga., 1864.
Cal. .36, 7½-inch barrel, 12 cylinder stops. Rifled 7 grooves left. Marked "C.S.A." on top of barrel.

The 12-stops on the cylinder which distinguish these revolvers was the application of an improved safety device brought out by the Manhattan Arms Company of Newark, N. J., in 1859. The original Colt safety consisted of a hole in the hammer face which engaged a pin projecting from the rear face of the cylinder between the cones. Later the hole in the hammer face was changed to a slot. These pins were easily damaged, and the constant strain on the cylinder bolt stop spring when the hammer was down on the pin usually resulted in a fracture after a short period. The extra slot in the periphery of the cylinder did away with the pins, released the strain on the spring and provided a positive safety by locking the cylinder with the hammer down between the capped cones.

Next to Leech & Rigdon, the best known and most successful of the Confederate revolver manufacturing concerns was the firm of Spiller & Burr. The close connection of Colonel Burton with this enterprise adds to the interest in its career. Although the Spiller & Burr revolver was modeled after the Whitney, and this article purports to deal with the Confederate "Colt," it is interesting to note that the Spiller & Burr revolver started out to be a "Colt." Edward N.

18 See Ansley vs. Starr, Laws of Georgia, November term, 1864, p. 21.
19 The Augusta (Ga.) *Chronicle*, November 24, 1864.
20 Rigdon returned to Memphis after the war and died there about 1866.

Spiller was a commission merchant in Baltimore before the war but, being a strong Southern sympathizer, he went to Richmond when hostilities began. There he formed a partnership with David J. Burr, a Richmond machinist-capitalist.[21] They intended to incorporate under the firm name of the Richmond Small Arms Manufactory, but the name does not seem to have been used.

Early in November, 1861, Colonel Burton wrote to Colonel Gorgas, Chief of Ordnance, as follows:

"Colonel—I have the honor to inform you that at your suggestion I have duly considered the subject of erecting a manufactory of revolving pistols of a model adapted to the requirements of the War Department and that I have decided to embark in the business provided the Department affords sufficient encouragement to me to do so, feeling confident that if I undertake such an enterprise with the mechanical skill and ability for its development and management now at my disposal, its success will be certain and creditable to all concerned.

"I have been induced to arrive at this conclusion in the expectation that the C. S. Government desires not only to supply their own wants at the present time, but also to foster and encourage the development of manufacturing enterprises generally within the limits of the Southern Confederacy and particularly such as are essential to the military defense of the Confederacy; and as there is not at the present time any establishment in the South prepared to supply revolving pistols in quantity, I look with confidence to the support of the C. S. Government in my proposed effort to inaugurate the manufacture of this much-needed weapon on our own soil.

"I propose to establish the manufactory in or near the City of Richmond and have made arrangements to secure the most experienced talent to engineer the mechanical requirements of the enterprise. I beg to enclose herewith a draft of the conditions and terms on which I propose to embark in the business and contract with the War Department for the supply of revolving pistols, to which draft I respectfully invite your attention and, if consistent with your views, your favorable consideration.

"Under a more favorable condition of surrounding circumstances I would be glad to propose more liberal terms, but in view of the present very high prices of materials, and the almost impossibility of obtaining them of suitable good quality at any price, I feel that I would not be justified in embarking in the business on a Government contract for a less number than 15,000 pistols at the sliding scale of prices proposed; my expectation being that this Government order will reimburse me for my outlay in developing the enterprise without subjecting me to positive loss should I receive no further orders. I propose to build and erect all the necessary machinery myself and will have to provide the means for doing so from Southern sources, so that the whole establishment will be purely Southern in its character and the result of Southern enterprise exclusively. Should the War Department be willing to award me a contract for pistols on substantially the terms and conditions I propose, I am prepared to commence making the necessary arrangements at once. A reply at your earliest convenience will oblige,

Very respectfully, your obt. servt.,

J. H. BURTON." [22]

[21] David J. Burr was head of the David J. Burr Machine Company of Richmond and later of the Burr & Ettinger Locomotive Works. See Bruce's "Iron Industry in Virginia."

[22] See Burton's correspondence.

The conditions proposed by Burton provided that the War Department should aid the contractors by advancing $20,000 on the signing of the contract, $20,000 at the end of three months and a further $20,000 at the end of six months, making $60,000 in all. This sum, or a maximum of $100,000 if necessary, was to be returned to the War Department in two years by deducting 20 per cent of the value of each delivery of pistols. The pistols were to be paid for at the rate of $30 for the first 5,000, $27 for the second 5,000 and $25 for the final 5,000. On their part the contractors agreed to supply the pistols at the rate of 4,000 by December 1, 1862; 7,000 by December 1, 1863, and 4,000 by June 1, 1864. The frames were to be of "good, tough brass properly electro-plated with silver." Nothing is said in this document about the type or model of the revolver to be supplied.[23]

Apparently, Burton had selected one Charles G. Morriss as the contractor, and Morriss' name appears in the original document. Meanwhile, however, on November 20, 1861, Burton entered into an agreement with Spiller & Burr, in which Burton agreed to obtain for Spiller & Burr a Government contract for 15,000 Navy revolvers. Burton also agreed to superintend the preparation of the necessary plans for the machinery, the erection of the buildings and the manufacture of the weapons. And ten days later, on November 30, the Confederate War Department entered into a contract with Spiller & Burr substantially the same as that proposed by Burton in his letter to Gorgas, with the exception that the contract specifies that the revolvers are to be "Navy size of a pattern substantially the same as that known as Colts, the model of which will be supplied by the said War Department." The frames were to be of brass electro-plated with silver.

A building was leased in Richmond, but, before the factory could be started it was decided to move the plant to Atlanta, Ga. Meanwhile, the project had met with difficulties. On April 20 there was severe criticism of Colonel Burton on the floor of the Confederate House. It was insinuated that Colonel Burton was neglecting the Government's business for his own. Burton was a man of spirit and the first thing he did was to send his resignation to Gorgas. Gorgas was not the type to desert a friend in an emergency, and he promptly wrote to the member of Congress responsible for the attack. Gorgas assumed all responsibility for Burton's connection with Spiller & Burr and added: "I do not hesitate to pronounce him the most competent and valuable officer we have connected with the Bureau and you will find that my high opinion of him is fully endorsed by the head of the Bureau of Ordnance of the Navy, Captain Minor." [24] Gorgas also protested to the Secretary of War, George W. Randolph, who wrote Colonel Burton declining to accept his resignation, and saying: "Your qualifications and services are too well known and too highly appreciated by this Department to permit its acceptance upon such grounds." [25]

In June, 1862, Burton went to Atlanta to arrange for the removal of the Spiller & Burr plant to that place. The move was made in the Fall of that same year, probably in September, if an item in a Richmond paper is correct.[26] On October 21 Spiller had an advertisement in the Atlanta *Constitution* for a "comfortable dwelling" and the advertisement was

[23] See Burton's letter book.

[24] Burton's note book.

[25] Burton's note book.

[26] Richmond *Dispatch*, September 29, 1862—Burr advertises for a brass moulder to go to Atlanta.

signed: "Address through Postoffice or call E. N. Spiller at the Pistol Factory." Burr seems to have remained in Richmond.

On December 17, 1862, Colonel Burton wrote from Macon to Colonel Gorgas telling him that Spiller would arrive in Richmond shortly with a sample of their revolvers. "Whilst the sample is, in my opinion, the best that has been produced in the Confederacy, yet it is not quite up to my standard of excellence in several minor particulars," he wrote. This letter of Burton's is a lengthy and frank one, in which he tells of the trouble he is having in keeping Spiller "on the right

Fig. 5. Spiller & Burr Revolver, Atlanta, Ga., 1863-64.

Whitney model, brass frame, 7-inch barrel, cal. .36; rifled 7 grooves left. Marked on top of barrel: "Spiller & Burr." Serial on various parts. Some have "C.S." on the side of the frame. Others have no marks except the serial.

track." Spiller, according to Burton, was a man "bred to purely commercial pursuits" and "at sea in manufacturing operations." In conclusion, Burton writes: "The pistols submitted by Mr. Spiller have been made after a pistol obtained from the U. S. which has so far served as a model, but I think it will be well for Spiller and Burr now to get up a model pistol to serve as a standard of reference, the cost of which the Government should defray, as also that of a set of inspection guages. All this I intend to do if you will authorize me. I have some doubt as to the calibre of these pistols being the same as that of the Colts Navy Pistol which I think is a trifle larger. As I have no means of testing this exactly I mention it in order that you may direct the point to be determined. I think the calibers should be the same and now is the time to make the correction if required." [27]

On January 1, 1863, Spiller wrote to Burton that he had returned from Richmond, where his pistols "were very favorably received" and that "Col. Gorgas seemed very well pleased with them." Spiller also said that upon examination his pistols were found to be a trifle smaller than the Colt's Navy and that he would have to change this, although it would give him trouble to do so. He reported that his request for an increased price for the pistols had been favorably received by Gorgas. This demand for increased price resulted in a new contract, which provided for the first 5,000 revolvers at $43; the second 5,000 at $37; and the final 5,000 at $35.

Writing to Burton about this new contract, Spiller calls attention to the fact that his firm had not agreed to make "Colt's Navy Pistol," as quoted in Gorgas' draft of the contract. He also expresses pleasure that the electro-plating is left out. The pistol is described as the "Whitney model." Again, on February 14, in a letter to Burton, Spiller says in part: "We have no pistols yet, but I think will get some hundred together by the end of February." Later on, in the same letter, he says: "I enclose you a draft of what I have determined to adopt as to the loading lever. It is an improvement I have lately seen on a new pistol taken from the Yankees and the most complete I have seen. Works as well or better than Colt's, is handsomer and can be much more easily made than Colt's." [28]

In this second contract, Spiller & Burr agree to deliver 600 revolvers in February, 1863, and 1,000 a month thereafter. On March 5 we find Burton writing to Spiller complaining about the delay in the first delivery of pistols. Burton said that Gorgas held him responsible for the prompt delivery of the pistols and that he thought the factory was in condition to produce them as per contract. But the progress was slow and it is hardly likely that more than 600 [29] of the Spiller & Burr revolvers were produced (Fig. 5). Finally, on January 7, 1864, the Government bought the Spiller & Burr plant, lock, stock and barrel, for $125,000. The factory was taken over by the Government and continued to manufacture the Whitney model, brass frame revolvers. Those made under Government ownership, however, bore only the serial and, generally, the letters, "C. S." stamped on the side of the frame. It is not likely that more than six or seven hundred were made.[30]

WE now have to consider the great enigma of the collector of Confederate revolvers—the so-called brass-frame Colt. There are more of these brass-frame Colts in museums and private collections than any other type of Confederate revolver. If the serials mean anything, there were more of the brass-frame Colts made than any other kind of Confederate revolver. And yet we cannot prove where or by whom they were made. (Fig. 6.)

After years of study and research, all the present writer can do is to advance a theory and submit the evidence to support it. The theory, which may come as a shock to some collectors, is this: That every genuine brass-frame Colt known to collectors was made at the same plant, the factory of Griswold & Grier, at Griswoldville, near Macon, Ga. The statements of old residents of the Griswoldville section agree that the revolvers made there were of the brass-frame variety. This factory began operations about July, 1862, and continued until November, 1864. The product was five finished weapons a day. A study of the serials of those brass-frame Colts in collections shows that at least 3,600 were manufactured. Only the Griswoldville plant could have turned out that large number. No other Confederate revolver manufactory equalled that record of production.[31] General Gorgas says the total number of revolvers manufactured in the Confederacy from November, 1863, to November, 1864, was only 2,353.[32]

In the *Macon Telegraph* of August 5, 1862, we find this interesting item: "Manufacture of Colt's Revolvers.—We were equally surprised and gratified on Saturday last at the sight of a Colt's Navy Repeater, made at the machine shops of

27 Burton's letter book.

28 Probably the Starr revolver. This catch was also used on the Leech & Rigdon revolvers, but rejected when the 12-stop cylinder revolvers were begun.

29 Of the Spiller & Burr revolvers in collections, the writer has never seen one bearing the firm name and with a serial above 600.

30 The writer has never heard of a Confederate brass-frame Whitney with a serial above 1200.

31 The sameness of the brass in the frames of these weapons, the general surplus of metal in the frames at the same point, the similarity of the rifling—six grooves right—and the fact that no two of these weapons have been found with the same serial tend to support the theory of a common origin. E. Berkley Bowie of Baltimore, who had the largest collection of brass-frame "Colts" in existence, and who had studied them for years, agreed with the writer.

32 Southern Historical Society Papers, Vol. 2, p. 62.

FIG. 6. GRISWOLD & GRIER REVOLVER MADE AT GRISWOLDVILLE, GA., 1862-64.
Brass frame, cal. .36, rifled 6 grooves right. No marks except serial on cylinder, barrel lug and frame.

Messrs. Griswold at Griswoldville, about 12 miles from Macon. The weapon has just passed the inspection of the Confederate Superintendent of Armories at this place, and a contract has been made for as many as the manufacturers can produce which they thought would be, for the present, about five a day. The pistol to our inexperienced eyes was as well finished as those made by the patentee himself,[33] and we have no doubt equally as efficient. These weapons are designed for the cavalry service.

"The specimen before us was the first fruit of the skill and inventive ingenuity in elaborating machinery and tools for the purpose of men who had never seen a pistol shop, or a single tool or piece of machinery for making them. The machines now in use have all been contrived and built since last March and the force of the establishment diverted from the manufacture of cotton gins to the making of Colt's revolvers with the well-known resources and enterprise of this concern. We need not say the business under their hands will grow to meet any demand likely to be made upon them. This is a strong illustration of the power of the South to supply her own wants. We certainly had no idea that a manufactory of Colt's pistols would spring up near Macon in 1862."

In a letter to Gorgas urging that the prices paid Spiller & Burr for their revolvers be increased, Colonel Burton said the Government was paying $50 each for the Griswoldville revolvers. That was in January, 1863. Gorgas, in a report to the War Department dated November 15, 1863, said pistols were being made under contract at Macon. This evidently refers to the Griswoldville enterprise. Gorgas refers to the plant as the factory of Griswold & Gunnison, but the firm name is usually given as Griswold and Grier.

On November 20, 1864, the Griswoldville pistol factory was destroyed by the Tenth Ohio Cavalry.[34] General Kilpatrick, commanding the Federal Cavalry, reports "the pistol factory at Griswoldville that we destroyed was a very large and valuable one."[35] In the battle at Griswoldville the employees of the factory put up a game fight. Leech & Rigdon's factory employes were also in this fight, as previously mentioned.

IF the origin of the brass-frame Colt is a puzzle to historians and collectors, the product of L. Haiman & Brother of Columbus, Ga., is equally so, because the writer knows of no specimen of their revolvers, although they must have manufactured several hundred. The Haimans were distinct assets to the Confederacy. Born in Prussia, Louis and Elias Haiman emigrated to this country and settled in Columbus when it was a mere village. They grew up with the place and at the outbreak of the war they were men of some means. In 1861 the Haimans opened a sword factory under the name of L. Haiman & Brother.[36] The project prospered and soon their plant covered a whole city block and employed several hundred hands. According to advertisements in the newspapers they manufactured beltplates, belts, saddles, swords, bayonets, tin camp furniture and wagon covers.[37]

On August 26, 1862, the firm was given a contract to make 10,000 Colt navy pistols and were advanced $50,000 on the contract. The Haimans purchased the Muscogee Iron Works and advertised for machinists and gunsmiths.[38]

In the Columbus *Daily Sun* of August 18, 1862, we find this interesting notice:

"Pistol Manufactory.—We intimated a few days since that there was a good prospect for the establishment in our city of a manufactory of Colt's celebrated repeaters. From the advertisement of Messrs. Haiman & Brother & Company, in another column, for machinists, we are glad to chronicle the enterprise as a fact soon to be put in operation.

"We hail this additional branch of industry to our busy little city as an omen of coming wealth and extension of mechanical ingenuity and enterprise. It gladdened our hearts sometime since to learn that Colt's repeaters were being manufactured at Griswoldville, Ga.; on the Central railroad. But we are more glad that now so enterprising a firm as Messrs. Haiman & Brother have brought this branch of industry nearer home. The establishment of this enterprise in connection with others in our city suggests a thought for parents who have sons, and particularly widowed mothers. Place your sons in some of these shops and let them learn how to be useful to themselves, the community and a blessing to

33 Colonel Colt, probably.
34 Off. Rec. XLIV, p. 54.
35 Off. Rec. XLIV, p. 508.

36 The writer has two swords made by L. Haiman & Brother, and they are fine specimens of the sword-makers art.
37 Columbus (Ga.) *Times*, September 2, 1861.
38 Columbus *Daily Sun*, Dec. 15, 1862; March 1, 1863, and March 20, 1863. Also *Atlanta Confederacy*, June 28, 1862.

you. There are now openings for industrious boys and youths throughout the length and breadth of the land which parents should not permit to pass unimproved."

On November 20, 1862, Colonel Burton wrote to E. N. Spiller of Spiller & Burr, Atlanta, complaining that drawings and designs for machinery which he had supplied Spiller & Burr had fallen into the hands of Haiman Brothers of Columbus.

The Haiman pistol factory must have gotten under way early in 1863. Says the Montgomery (Ala.) *Weekly Advertiser* of May 6, 1863: "The Columbus papers state that Mr.

Fig. 7. Tucker, Sherrod & Company "Colt" Dragoon, Lancaster, Texas, 1863-64.

7½-inch barrel, cal. .44, no aperture on right side of frame to facilitate loading; rifled 7 grooves right. Some had a silver star set in the grip with wooden screw. No marks except serials.

Haiman in that city is now engaged in the manufacture of repeating pistols equal in every respect to the celebrated Colt's pistols." And in the Montgomery *Daily Advertiser* of May 8, 1863, appears this advertisement: "One hundred gunsmiths and machinists wanted in the pistol factory in Columbus, Ga., good machinists and gunsmiths. Piece work will be given and all who remain with us over three months will have their traveling expenses refunded."

Colonel Burton says in his note book that he was in Columbus on January 19, 1864, to report upon the expediency of purchasing the Haiman pistol factory for the Government. He reported to Gorgas and estimated its value at $80,000.[39] The plant was not sold to the Government, but was destroyed by General Wilson. In his report of April 18, 1865, Wilson says he destroyed Haiman's iron foundry and pistol factory and that the latter "was about ready to commence making revolvers similar to Colt's."[40] Other evidence, however, shows that between 300 and 500 revolvers were manufactured by Haiman, but there is nothing to show what type they were. If it were possible to prove that the brass-frame Colts were of two distinct varieties, we might properly attribute one type to Haiman, but this question has already been discussed.

THE great State of Texas, far removed from the industrial centers of the country, made a valiant effort to supply its men with arms. In the report of the Military Board of Texas to the State Legislature, dated November 4, 1863, it is stated that Tucker, Sherrod & Company, of Lancaster, Dallas county, had been awarded a contract for 3,000 revolvers "after pattern known as Colt's, one-half army, remainder navy size." The samples submitted, however, were not approved by the Board and the contract was cancelled.

The firm went ahead, however, and made several hundred of these revolvers, as the following article in the *Texas Almanac,* Austin, February 28, 1863, bears witness: "Six Shooters—We were shown the other day a beautiful specimen of a six-shooter, manufactured in Dallas by Colonel Crockett, who has a large armory now in successful operation. The pistol appears in every respect quite equal to the famous Colt's six-shooter, of which it is an exact copy, with the exception of an extra sight on the barrel which we think is a decided improvement. We learn that Colonel Crockett has now 400 of these pistols on hand, which he has manufactured within the last six months, and which he has offered to the Governor at remarkable low figures—not one-third of what they could be sold at by retail. We hope they will not be allowed to go out of the State, as it is notorious how deficient we are in arms for home defense." This Colonel Crockett was the agent for the firm.

The Tucker, Sherrod & Company revolver is interesting, because it is the only revolver made in the Confederacy (of which we have knowledge) of Dragoon size. In appearance they resemble closely the Colt's Dragoon. (Fig. 7.) A peculiar feature of the Tucker, Sherrod & Company revolver is the absence of loading aperture on the right side of the frame.

Another Texas-made Confederate revolver was that made by Dance Brothers & Park, at Columbia, Texas. They were made in both Army and Navy sizes and their most conspicuous peculiarity was the flat frame which provided for no recoil shield. Near the close of the war Dance Brothers & Park moved their plant to Anderson, about 70 miles northwest of Columbia.[41] (Fig. 8.)

ACCORDING to the Confederate Patent Office records, only one revolver was patented and made in the Confederacy. The other revolvers manufactured there were "captured" models. The lone exception was the Cofer revolver, one of the rarest of all American weapons.

Fig. 8. Dance Brother & Park Revolver, Made at Columbia, Texas, 1863-64.

8½-inch barrel, cal. .44; frame is flat and has no recoil shield. No marks except serial on various parts. Rifled 7 grooves right. Also made in Navy size.

Thomas W. Cofer was granted a patent on August 12, 1861, for a brass-frame revolver, the most conspicuous feature of which was a sheath trigger, rather unusual for a military revolver. Cofer was a resident of Portsmouth, Va., just across the river from Norfolk, and he promptly set up a little shop there, employing less than a dozen hands. (Fig. 9.) The Richmond *Daily Examiner* of July 17, 1861, says:

39 In his report of November 15, 1863, already referred to, General Gorgas said: "Revolving pistols are fabricated under contract at Macon, Columbus and Atlanta, Ga. The number produced is about 500 per month now." Evidently his references were: Macon (Griswold & Grier) Columbus (L. Haiman and Brother) and Atlanta (Spiller & Burr).

40 Off. Rec. XLIX, Part I, p. 486.

41 F. R. Billingslea, of Tulsa, Okla., an ardent collector, has a third type of "Colt," which is said to have been made at Marshall, Texas, and which undoubtedly is of Confederate manufacture.

FIG. 9. COFER REVOLVER, PORTSMOUTH, VA., 1861-62.

7-inch barrel, cal. .36, brass frame, rifled 7 grooves right. Marked on top of frame and barrel: "T. W. Cofer's Patent, Portsmouth, Va."

"Mr. T. W. Cofer of Portsmouth, Va., has just completed an improvement in revolving firearms whereby the process of loading is so much facilitated that a Colt or other revolver may be loaded and discharged with fourfold rapidity. Mr. Cofer, says the Portsmouth *Transcript,* has left for Richmond to secure a patent for his invention." And the Richmond *Examiner* of October 17, 1861, says: "A citizen of Portsmouth, T. W. Cofer, has made and patented a revolving pistol which seems to possess very many advantages over that of Colt's, so general in use and from which in the manner of loading it differs in sundry important aspects while it is of long range and equal accuracy. It is fired with a prepared Minie cartridge and about these times must be considered not only a useful invention, but a decided evidence of the inventive genius of the Southern people." In *De Bow's Review* for March-April, 1862, we find this note (page 327): "Thomas W. Cofer, inventor of a revolving pistol pronounced by judges to be superior to the Colt pistol. At present he is engaged in manufacturing them on a small scale at Portsmouth, Va."

But by the time the *Review* came off the press, Norfolk had fallen, and the Cofer plant closed. The writer can find no record of the manufacture of these revolvers elsewhere, so there must have been very few made—certainly fewer than a hundred. In the report of the Confederate Commissioner of Patents, for 1864, there is a list of patents expiring that year and among them is this: "T. W. Cofer, Portsmouth, Va., revolving pistol, August 12, 1864."

As the war progressed the Confederate authorities, recognizing the necessity of a central establishment for the production of small arms, planned to erect a great armory at Macon, Ga.; a point of easy access, near to a fertile corn region, and out of the way of the enemy. Colonel Burton went to Europe in 1863 and negotiated for machinery with a capacity of 10,000 arms a month. Six months before the end of the war the blockade had become so impregnable that it was decided to set up the arms plant in Europe and run the manufactured product through the blockade. The collapse of the Confederacy ended this plan.

And now a word as to Selma, Ala. There is not a line of documentary evidence to show that any small arms were made at Selma. In 25 years of active collecting the writer has never seen a gun or pistol of Selma origin. All the evidence is to the contrary. In a list of Government buildings at Selma in 1865 [42] there are listed the C. S. Naval Foundry, Selma Iron Works, Nitre Works, Powder Works, horse shoe factory, shovel factory and several foundries, but no armory. In fact there is the positive statement in the Official Records, War of the Rebellion, that no small arms were made there.[43]

AN article on Confederate revolvers is not complete without some mention of what was, perhaps, the most famous of all of them—the Le Mat "grapeshot" revolver. One frequently hears that some of the Le Mat revolvers were made in New Orleans. There is not the slightest bit of documentary evidence to substantiate this statement, other than an article copied from the New Orleans *Daily Delta* of June, 1861, which says that F. W. C. Cook, of the firm of Cook & Brother, manufacturers of Enfield model guns, "contemplates the manufacture of Dr. Le Mat's grapeshot revolver, one of the most formidable weapons of the pistol kind ever invented." [44]

Col. Jean Alexandre Francois Le Mat was a resident of New Orleans in 1856 when he was granted a patent by the United States Patent Office. Undoubtedly, he made, or had made, a model at that time. It is entirely possible that this model is preserved by some collector. But Le Mat ran the blockade and took passage for Europe on the English mail liner TRENT, the same ship which carried Mason and Slidell. He escaped capture when the TRENT was stopped and Mason and Slidell were taken prisoners. Le Mat went to Paris and entered into a partnership with C. Girard and Company to make his revolvers. (Fig. 10.)

General Gorgas reported on August 12, 1861, that he had given Le Mat a contract to make 5,000 revolvers for the War Department.[45] Later the Confederate Navy Department gave Le Mat a contract for 2,000. (Some letters refer to it as

42 Off. Rec. Vol. XLIX, Part I, p. 489.
43 Off. Rec. Vol. XXIV, Part 3, p. 219.
44 Richmond *Daily Examiner*, June 28, 1861.
45 Off. Rec. Series IV, Vol. I.

Fig. 10. Le Mat "Grapeshot" Revolver. Made in Paris, 1862-65.

The cylinder contains nine chambers of cal. .42 and revolves on a large-bore barrel of 60 caliber in which a shot cartridge is fired.

3,000) to be delivered for inspection in London. Captain Bulloch, the Confederate naval agent in London, reported to the Secretary of the Navy, Stephen A. Mallory, that those submitted were unsatisfactory.[46] Later, on the ground that the agreement to deliver the revolvers at the rate of 500 a month, beginning November 1, 1863, had not been carried out, the contract was cancelled.[47]

Capt. John M. Payne, detailed as ordnance officer in charge of imported munitions of war at Wilmington, N. C., reports the receipt there of 150 Le Mat revolvers in July, 1863, which were "not approved."[48] These may have been some of the Navy Le Mats, as hundreds of Le Mat revolvers were in use in the Confederacy before July, 1863. The order book of Captain Payne, lists many cases of Le Mat revolvers received through the blockade in 1864 and forwarded to the War Department in Richmond. When Lieut. John Taylor Wood and a party of picked men from the C. S. S. Patrick Henry burned the steamship Alleganian in November, 1862, it is recorded that the men were armed with Le Mat revolvers.[49] Kent, Paine & Company, Richmond arms dealers, advertised Le Mat revolvers for sale in December, 1862.[50]

Le Mat revolvers were recognized for use in the army. "The Field Manual for the Use of Confederate Officers on Ordnance Duty" refers to them on page 54. In the Confederate Museum in Richmond are Le Mat revolvers used by Gen. J. E. B. Stuart, General Beauregard and Gen. Patton Anderson. The Chicago Historical Society has the Le Mat revolver carried by Maj. Henry Wirz. The writer has a list of fifty-odd Le Mat revolvers in museums and private collections, the highest serial of which is 2389. This conveys some idea of the number manufactured.

There were many changes in the Le Mat models. The earliest ones had round barrels, spur trigger guards, loading levers on right side and were marked "Le Mat's Patent." Later the marking was changed to "Col. LeMat's Patent." Then the loading lever was shifted to the left side and the spur was removed from the trigger-guard. The markings were changed to "Col. Le Mat, bte. s.g.d.g. Paris."[51] The last made were marked "Syst. Le Mat, bte, s.g.d.g. Paris." The writer has heard of Le Mat revolvers marked "Le Mat & Girard, London," but never saw one. Of course, all these references are to the percussion Le Mat. The pin-fire Le Mat revolver was a post-war model and had no connection with the Confederacy. Le Mat also made a few revolving carbines on the same model as his percussion revolver. In fact, some of the carbine and revolver parts are interchangeable.

The Le Mat revolver had serious faults, the most notable being the small, movable "nose" on the end of the hammer. When this "nose" was turned down, it fired the shot charge. When it was broken off and lost, as was frequently the case, the weapon was useless.

Another and even more serious defect was that the Le Mat revolver would not take the regulation caliber .44 ammunition in use in both armies. The importance of a standard caliber for small arms was realized by ordnance officers of both the Union and Confederate forces, and some excellent improved arms were rejected because they required special ammunition.

Postscript—The late E. Berkley Bowie, to whom this incomplete and imperfect narrative is dedicated, was one of the best informed men on arms and munitions of the Civil War period. For 30 years he had been an ardent collector of Confederate arms and for the same length of time he had collaborated with the author in gathering data on the same subject. Without his aid and encouragement this article never would have been written.

A cultured gentleman, Mr. Bowie's sudden death last February was a great shock to his friends and fellow-collectors. Plans are being made to have his large and interesting collection of firearms, embracing every period of American history, preserved.—R. D. S.

46 Off. Rec. Series II, Vol. II, p. 291.
47 Off. Rec. Series II, Vol. II, p. 795-6.
48 Payne's record book in the Confederate Museum, in Richmond.
49 Off. Rec. Vol. V, p. 141.
50 The Richmond *Whig*, December 4, 1862.
51 "Manufactured for the inventor."

Supervision of the Trade in Arms

The Proposed Convention as Consented to by the U. S. Senate

THIS Convention for the Supervision of the International Trade in Arms and Ammunition and in Implements of War, signed at Geneva on June 17, 1925, is of special interest at this time. The United States Senate on June 15, 1934, gave its advice and consent—with a reservation—to the ratification of the Convention. The reservation provides that the Convention "shall not come into force so far as the United States is concerned until it shall have come into force in respect to Belgium, the British Empire, Czechoslovakia, France, Germany, Italy, Japan, Sweden and the Union of Soviet Socalist Republics, and with the further understanding that such adherence to this Treaty shall not be construed as defining any right of sovereignty which the Kingdom of Persia may have in and to the Persian Gulf or to the waters thereof." The President of the United States has not as yet ratified. The Convention itself has not as yet been ratified by a sufficient number of powers to bring it into force.

The status of ratifications by those governments mentioned in the Senate reservation is (as of August 7, 1934) as follows: (1) Belgium: to the same extent as does the effect of the Convention apply in the United States of America, Austria, France, Great Britain, Czechoslovakia, Germany, Italy, Japan, Spain, Sweden, Switzerland; (2) British Empire: does not bind India or any British Dominion which is a separate Member of the League of Nations and does not separately sign or adhere to the Convention. Moreover, Great Britain's ratification will not become effective until the ratifications are made by Austria, Belgium, Czechoslovakia, Germany, Italy, Japan, Spain, Sweden and United States of America. (3) The ratification by France will not become effective until the ratifications of the Convention by Belgium, Czechoslovakia, Italy, Japan, Sweden and the United States of America have become effective in accordance with Article 41 of the Convention. (4) Sweden: Subject to the condition that this ratification will only take effect when the other producing States shall have ratified the Convention. (5) *Czechoslovakia, Germany, Italy and Japan have not ratified the Convention; the Union of Soviet Socialist Republics has not acceded to it.*—EDITOR.

UNDER the terms of a resolution of ratification, with a reservation, adopted by the United States Senate June 15, 1934, the following convention for the supervision of the international trade in arms will be effective in respect of the United States when it shall have come into force in respect to Belgium, the British Empire, Czechoslovakia, France, Germany, Italy, Japan, Sweden and the Union of Soviet Socalist Republics. The subject is of special interest to readers at this time. The text of the convention follows:

CONVENTION FOR THE SUPERVISION OF THE INTERNATIONAL TRADE IN ARMS AND AMMUNITION AND IN IMPLEMENTS OF WAR.

Germany, the United States of America, Austria, Belgium, Brazil, the British Empire, Canada, the Irish Free State and India, Bulgaria, Chile, China, Colombia, Denmark, Egypt, Spain, Esthonia, Abyssinia, Finland, France, Greece, Hungary, Italy, Japan, Latvia, Lithuania, Luxemburg, Nicaragua, Norway, Panama, the Netherlands, Persia, Poland, Portugal, Roumania, Salvador, Siam, Sweden, Switzerland, the Kingdom of the Serbs, Croats, and Slovenes, Czechoslovakia, Turkey, Uruguay and Venezuela.

Whereas the international trade in arms and ammunition and in implements of war should be subjected to a general and effective system of supervision and publicity;

Whereas such a system is not provided by existing Treaties and Conventions;

Whereas in relation to certain areas of the world a special supervision of this trade is necessary in order to render more effective the measures adopted by the various Governments as regards both the import of such arms and ammunition and implements of war into these areas and their export therefrom; and

Whereas the export or import of arms, ammunition or implements, the use of which in war is prohibited by International Law, must not be permitted for such purpose;

Have decided to conclude a Convention and have accordingly appointed as their Plenipotentiaries:

[*Here follow the names of the Plenipotentiaries.*]

Who, having communicated their full powers, found in good and due form, have agreed as follows:

CHAPTER I. CATEGORIES.

ARTICLE 1. For the purposes of the present Convention, five Categories of arms, ammunition and implements are established:

Category 1. Arms, Ammunition and Implements of War Exclusively Designed and Intended for Land, Sea or Aërial Warfare. — A — Arms, ammunition and implements exclusively designed and intended for land, sea or aërial warfare, which are or shall be comprised in the armament of the armed forces of any State, or which, if they have been but are no longer comprised in such armament, are capable of military to the exclusion of any other use, except such arms, ammunition and implements which, though included in the above definition, are covered by other Categories.

Such arms, ammunition and implements are comprised in the following twelve headings: 1. Rifles, muskets, carbines. 2. (a) Machine guns, automatic rifles and machine pistols of all calibers; (b) mountings for machine guns; (c) interrupter gears. 3. Projectiles and ammunition for the arms enumerated in Nos. 1 and 2 above. 4. Gun-sighting apparatus including aërial gun sights and bomb sights and fire-control apparatus. 5. (a) Cannon, long or short, and howitzers, of a caliber less than 5.9 inches (15-c.m.); (b) cannon, long or short, and howitzers, of a caliber of 5.9 inches (15-c.m.) or above; (c) mortars of all kinds; (d) gun carriages, mountings,

recuperators, accessories for mountings. 6. Projectiles and ammunition of the arms enumerated in No. 5 above. 7. Apparatus for the discharge of bombs, torpedoes, depth charges and other kinds of projectiles. 8. (a) Grenades; (b) bombs; (c) land mines, submarine mines, fixed or floating, depth charges; (d) torpedoes. 9. Appliances for use with the above arms and apparatus. 10. Bayonets. 11. Tanks and armored cars. 12. Arms and ammunition not specified in the above enumeration.

B.—Component parts, completely finished, of the articles covered by A above, if capable of being utilized only in the assembly or repair of the said articles, or as spare parts.

Category II. Arms and Ammunition Capable of Use Both for Military and Other Purposes.—A.—1. Pistols and revolvers, automatic or self-loading, and developments of the same, designed for single-handed use or fired from the shoulder, of a caliber greater than 6.5-mm. and length of barrel greater than 10 c.m. 2. Fire-arms designed, intended or adapted for non-military purposes, such as sport or personal defence, that will fire cartridges that can be fired from fire-arms in Category I; other rifled firearms firing from shoulder, of a caliber of 6-mm. or above, not included in Category I, with the exception of rifled firearms with a "break-down" action. 3. Ammunition for the arms enumerated in the above two headings, with the exception of ammunition covered by Category I. 4. Swords and lances.

B.—Component parts, completely finished, of the articles covered by A above, if capable of being utilized only in the assembly or repair of the said articles, or as spare parts.

Category III. Vessels of War and Their Armament.—1. Vessels of war of all kinds. 2. Arms, ammunition and implements of war mounted on board vessels of war and forming part of their normal armament.

Category IV.—1. Aircraft, assembled or dismantled. 2. Aircraft engines.

Category V.—1. Gunpowder and explosives, except common black gunpowder. 2. Arms and ammunition other than those covered by Categories I and II, such as pistols and revolvers of all models, rifled weapons with a "break-down" action, other rifled firearms of a caliber of less than 6-mm. designed for firing from the shoulder, smooth-bore shotguns, guns with more than one barrel of which at least one barrel is smoothbore, firearms firing rimfire ammunition, muzzle-loading firearms.

Chapter II. Supervision and Publicity

ARTICLE 2. The High Contracting Parties undertake not to export or permit the export of articles covered by Category I, except in accordance with the following conditions: 1. The export shall be for a direct supply to the Government of the importing State or, with the consent of such Government, to a public authority subordinate to it; 2. An order in writing, which shall be signed or endorsed by a representative of the importing Government duly authorized so to act, shall have been presented to the competent authorities of the exporting country. This order shall state that the articles to be exported are required for delivery to the importing Government or public authority as provided in paragraph 1.

Article 3. Nevertheless, export for supply to private persons may be permitted in the following cases:

1. Articles covered by Category I exported direct to a manufacturer of war material for use by him for the requirements of his industry, provided their import has been duly authorized by the Government of the said importing country;

2. Rifles, muskets and carbines and their ammunition exported for supply to rifle associations formed for the encouragement of individual sport and duly authorized by their own Government to use them, the import of which is not contrary to any other provisions of the present Convention. Such arms and ammunition shall be sent direct to the Government of the importing country for transmission by such Government to the associations for which they are supplied.

3. Samples of articles covered by Category I exported for demonstration purposes direct to a trade representative of the exporting manufacturer, such representative being duly authorized by the Government of the importing country to receive them.

In the above-mentioned cases, an order in writing, endorsed by the Government of the importing country or by its representative duly authorized so to act, must have been presented to the authorities of the exporting country. It shall contain all the information necessary to show that the order is properly made under this Article.

Article 4. Permission to export under Articles 2 and 3 shall be signified by a license. An export declaration, if filed with and approved by the competent authorities of the exporting country, may take the place of a license.

Such license or declaration must contain: (a) A description sufficient for the identification of the articles to which it relates, and giving their designation according to the headings in Category I, and their number or weight; (b) the name and address of the exporter; (c) the name and address of the importing consignee; (d) the name of the Government which has authorized the import.

Each separate consignment which crosses the frontier of the exporting country, whether by land, water or air, shall be accompanied by a document containing the particulars indicated above. This document may be either the license or export declaration or a certified copy thereof or a certificate issued by the Customs authorities of the exporting country, stating that the consignment is exported under license or export declaration in accordance with the provisions of the present Convention.

Article 5. The articles covered by Category II shall only be exported under cover of an export document, which may be either a license issued by the competent authorities of the exporting country or an export declaration endorsed by or filed with them. If the legislation of the importing country requires the endorsement of a duly authorized representative of its Government, and if this fact has been notified by the said Government to the Government of the exporting country, then such an endorsement must have been obtained and submitted to the competent authorities of the exporting country before the export may take place.

Neither the license nor the export declaration shall entail any responsibility upon the Government of the exporting country as to the destination or ultimate use of any consignment.

Nevertheless, if the High Contracting Parties consider, on account of the size, destination or other circumstances of a consignment, that the arms and ammunition consigned are intended for war purposes, they undertake to apply to such consignment the provisions of Articles 2, 3 and 4.

Article 6. As a preliminary to a general system of publicity for armaments irrespective of their origin, the High Contracting Parties undertake to publish, within two months

of the close of each quarter, a statistical return of their foreign trade during this quarter in the articles covered by Categories I and II. This return shall be drawn up in accordance with the specimen forms contained in Annex I to the present Convention and shall show under each heading appearing in Categories I and II in Article 1 the value and the weight or number of the articles exported or imported under a license or export declaration, allocated according to country of origin or destination.

In all cases where the consignment comes from, or is sent to, a territory possessing an autonomous customs system, such territory shall be shown as the country of origin or destination.

The High Contracting Parties further undertake, so far as each may be concerned, to publish within the same time-limits a return containing the same information in respect of the consignments of articles covered by Categories I and II to other territories placed under their sovereignty, jurisdiction, protection or tutelage, or under the same sovereignty, jurisdiction, protection or tutelage.

The first statistical return to be published by each of the High Contracting Parties shall be for the quarter beginning on the first day of January, April, July or October, subsequent to the date on which the present Convention comes into force with regard to the High Contracting Party concerned.

The High Contracting Parties undertake to publish as an annex to the above-mentioned return the text of the provisions of all statutes, orders or regulations in force within their territory dealing with the export and import of articles covered by Article 1, and to include therein all provisions enacted for the purpose of carrying out the present Convention. Amendments and additions to these provisions shall be likewise published in annexes to subsequent quarterly returns.

ARTICLE 7. The High Contracting Parties, in all cases covered by Category III, undertake to publish within two months of the close of each quarter a return for that quarter, giving the information detailed below for each vessel of war constructed, in course of construction or to be constructed within their territorial jurisdiction on behalf of the Government of another State:

(a) The date of the signing of the contract for the construction of the vessel, the name of the Government for which the vessel is ordered, together with the following data: Standard displacement in tons and metric tons; the principal dimensions, namely: length at water-line, extreme beam at or below water-line, mean draft at standard displacement;

(b) The date of laying the keel, the name of the Government for which the vessel is being constructed, together with the following data: Standard displacement in tons and metric tons; the principal dimensions, namely: length at water-line, extreme beam at or below water-line, mean draft at standard displacement;

(c) The date of delivery, the name of the Government to which the vessel is delivered, together with the following data with respect to the vessel at that date: Standard displacement in tons and metric tons; the principal dimensions, namely: length at water-line, extreme beam at or below water-line, mean draft at standard displacement;

As well as the following information regarding the armament installed on board the vessel at the date of delivery and forming part of the vessel's normal armament: Number and caliber of guns; number and caliber of torpedo-tubes; number of bomb-throwers; number of machine-guns.

The above information concerning the armament of the vessel shall be furnished by means of a statement signed by the shipbuilder and countersigned by the commanding officer or such other representative fully authorized for the purpose by the Government of the State to whom the vessel is delivered. Such statement shall be transmitted to the competent authority of the Government of the constructing country.

Whenever a vessel of war belonging to one of the High Contracting Parties is transferred, whether by gift, sale or other mode of transfer, to the Government of another State, the transferor undertakes to publish within two months of the close of the quarter within which the transfer is effected the following information: The date of transfer, the name of the Government to whom the vessel has been transferred and the data and information referred to in paragraph (c) above.

By the standard displacement in the present Article is to be understood the displacement of the vessel complete, fully manned, engined and equipped ready for sea, including all armament and ammunition, equipment, outfit, provisions and fresh water for crew, miscellaneous stores and implements of every description that are intended to be carried in war, but without fuel or reserve feed-water on board.

Article 8. Without prejudice to the provisions of Article 7, if the transport of any vessel of war is carried out otherwise than by such vessels's own motive power or towage, the vessel, whether assembled or in component parts, and the armament thereof will become subject also to the provisions of this Convention as if they were included in Category I.

Article 9. The High Contracting Parties undertake to publish, within six months of the close of each quarter, a return for that quarter of the export of aircraft and aircraft engines, giving quantities exported and their allocation according to country of destination.

Article 10. Subject to the provisions of Chapter III, the articles covered by Categories IV and V may be exported without formalities or restrictions.

Article 11. The High Contracting Parties undertake not to apply a more favorable regime to imports of articles referred to in Article 1 coming from territories of non-contracting States than that which they will apply to such imports coming from territories of contracting States, and to subject these imports, of whatever origin, to the same conditions of authorization and, so far as possible, of publicity.

CHAPTER III. SPECIAL ZONES

ARTICLE 12. The High Contracting Parties agree that the provisions of this Chapter apply to the territorial and maritime zones hereinafter defined and referred to in the present Convention as the "special zones."

1. Land zone. (a) The whole of the continent of Africa, with the exception of Egypt, Lybia, Tunisia, Algeria, the Spanish possessions in North Africa, Abyssinia, and of the Union of South Africa together with the territory under its mandate, and of Southern Rhodesia. This zone also includes the adjacent islands which are situated within 100 marine miles from the coast thereof and also Prince's Island (Principe) in the Bight of Biafra, St. Thomas (Sâo Thomé), Annobon and Socotra, but does not include the Spanish islands situated to the north of the parallel of 26° N. latitude

(b) The Arabian peninsula, Gwadar, Syria and Lebanon, Palestine and Transjordan, and Iraq.

2. Maritime zone. A maritime zone, which includes the Red Sea, the Gulf of Aden, the Persian Gulf and the Gulf of Oman and is bounded by a line drawn from and following the latitude of Cape Guardafui to the point of intersection with longitude 57° East of Greenwich and proceeding thence direct to the point at which the eastern frontier of Gwadar meets the sea.

Article 13. The High Contracting Parties undertake not to export or to permit articles covered by Categories I, II, IV and V to be exported to places within the special zones, unless a license has been issued in conformity with the conditions defined in Article 14. An export declaration, if filed with and approved by the competent authorities of the exporting country, may take the place of a license.

The High Contracting Parties also undertake, each in respect of any territory under its sovereignty, jurisdiction, protection or tutelage situated within the special zones, not to permit articles covered by the Categories above mentioned to be imported into such territory unless their import has been authorized by the authorities of the territory concerned. Such articles shall only be admitted into territory within the special zones at such ports or other places as the authorities of the State, colony, protectorate or mandated territory concerned shall designate for this purpose.

Article 14. The High Contracting Parties undertake not to issue the export licenses nor to approve the export declarations required under Article 13 unless they are satisfied that the conditions stated in paragraph (a) or (b) hereof are fulfilled and also, as regards articles covered by Categories I and II, the conditions laid down in Articles 2, 3, 4 and 5.

(a) That, if an export is being made to territory under the sovereignty, jurisdiction, protection or tutelage of a High Contracting Party, articles covered by Categories I, II and IV to which the license or export declaration applies are required for lawful purposes and that the authorities of the territory to which they are consigned are willing to admit them; and that, in the case of articles covered by Category V, a copy of the license or export declaration has been sent to the authorities aforesaid before the export takes place. (b) That, if an export is being made to territory which is not under the sovereignty, jurisdiction, protection or tutelage of a High Contracting Party, articles covered by Categories I, II, IV and V are required for lawful purposes.

Article 15. The High Contracting Parties undertake to publish, in addition to the returns provided for in Article 6 and Article 9 in respect of articles covered by Categories I, II and IV, a return of articles covered by Category V exported to territory situated within the special zones. This return shall be published within the same time limits and at the same intervals as those provided in the first paragraph of Article 6, and shall contain, as far as possible, the same particulars.

Article 16. The trade in articles covered by Categories I, II, IV and V within the special zones shall be placed under the supervision of officials of the authorities of the State, colony, protectorate or mandated territory concerned.

The admission and transit of and trade in such articles within the said zones shall also be subject to the provisions of Section I, § § 1 and 2, of Annex II of the present Convention, to which provisions the High Contracting Parties undertake to conform.

An authorization must be given by a duly authorized representative of the authorities aforesaid in each case before any such articles may be reconsigned to any place outside the territory to which they have been admitted.

Article 17. The manufacture, assembly and repair within the special zones of articles covered by Categories I, II, IV and V shall be subject to the provisions of Section I, § 3, of Annex II of the present Convention, to which provisions the High Contracting Parties undertake to conform.

ARTICLE 18. The High Contracting Parties undertake, each in respect of any territory under its sovereignty, jurisdiction, protection or tutelage situated within the special zones, not to permit the transit by land across such territory of articles covered by Categories I, II, IV and V when their destination is another territory also situated in the special zones, unless their transport to their destination is assured and the authorities of the latter territory have authorized their import.

The prohibition referred to in the above paragraph shall not apply to the transit of such articles through a territory situated in the special zones when their destination is territory of one of the High Contracting Parties not included in the said zones, provided that their transport to their destination is assured.

If, for the purposes of transport to a territory situated within the special zones, it is necessary to pass through a contiguous territory likewise situated within the said zones, the transit shall be permitted, subject always to the conditions laid down in the first paragraph hereof, at the request of the authorities of the importing territory, provided that such authorities guarantee that the articles in respect of which the request is made shall not at any time be sold, or otherwise transferred, contrary to the provisions of the present Convention. Nevertheless, if the attitude or the disturbed condition of the importing State constitutes a threat to peace or public order, permission for transit shall be refused to such State by the authorities of all such contiguous territories until this threat has ceased to exist.

Article 19. Subject to any contrary provisions in existing special agreements or in any future agreements, provided that in all cases such agreements otherwise comply with the provisions of the present Convention, the High Contracting Parties agree that in the special zones the authorities of the State, colony, protectorate or mandated territory concerned shall carry out within their territorial waters the supervision and police measures necessary for the application of the present Convention.

Article 20. The High Contracting Parties agree that within the special zones no native vessel, as hereinafter defined, of less than 500 tons (net tonnage) shall be allowed to ship, discharge or tranship articles covered by Categories I, II, IV and V.

A vessel shall be deemed to be a native vessel if she is either owned, fitted out or commanded by a native of any country bordering on the Indian Ocean west of the meridian of 95° East of Greenwich and north of the parallel of 11° South latitude, the Red Sea, the Persian Gulf, or the Gulf of Oman, or if at least one-half of the crew are natives of such countries.

The provisions of paragraph 1 hereof do not apply to lighters or barges or to vessels engaged exclusively in the coasting trade between different ports of the same State,

colony, protectorate or mandated territory where warehouses are situated. The conditions under which articles covered by Categories I, II, IV, and V may be carried by such vessels are laid down in § 1 of Section II, of Annex II of the present Convention, to which the High Contracting Parties undertake to conform.

The provisions of this Article and of Section II, § 1, of Annex II do not apply: (a) To arms, ammunition or implements carried on behalf of a Government either under an authorization or accompanied by a duly authorized official of such Government; or

(b) To arms and ammunition in the possession of persons provided with a license to carry arms on the condition that such arms are for the personal use of the bearer and are accurately described in such license.

ARTICLE 21. The High Contracting Parties agree that, with the object of preventing all illicit conveyance within the special zones of articles covered by Categories I, II, IV, and V, all native vessels within the meaning of Article 20 must carry a manifest of their cargo or a similar document specifying the quantities and nature of the goods on board, their origin and destination. This manifest shall remain covered by the secrecy to which it is entitled by the law of the State to which the vessel belongs, and must not be examined during proceedings for the verification of the flag, unless the interested party consents thereto.

The provisions of this Article shall not apply to: (a) Vessels exclusively engaged in the coasting trade between different ports of the same State, colony, protectorate or mandated territory; or (b) Vessels engaged in carrying arms, ammunition and implements on behalf of a Government under the conditions defined in Article 20 (a) and proceeding to or from any point within the said zones; or (c) Vessels only partially decked, having a maximum crew of ten men, and exclusively employed in fishing within territorial waters.

Article 22. The High Contracting Parties agree that no authorization to fly the flag of any of such High Contracting Parties shall be granted to native vessels of less than 500 tons (net tonnage) as defined in Article 20, except in accordance with the conditions prescribed in Section II, §§ 3 and 4, of Annex II of the present Convention. Such authorization, which shall be in writing, shall be renewed every year and shall contain the particulars necessary to identify the vessel, the name, tonnage, type of rigging, principal dimensions, registered numbered and signal letters if any. It shall bear the date on which it was granted and the status of the official who granted it.

Article 23. The High Contracting Parties agree to communicate to any other High Contracting Party who so requests the forms of the documents to be issued by them under Articles 20 (a), 21 and 22 and Section II, § 1, of Annex II.

The High Contracting Parties further agree to take all necessary measures to insure that the following documents shall be supplied as soon as possible to any other High Contracting Party who has requested the same: (a) Certified copies of all authorizations to fly the flag granted under the provisions of Article 22; (b) notice of the withdrawal of such authorizations; (c) copies of authorizations issued under Section II, § 1, of Annex II.

Article 24. The High Contracting Parties agree to apply in the maritime zone the regulations laid down in Annex II, Section II, § 5, of the present Convention.

Article 25. The High Contracting Parties agree that any illicit conveyance or attempted conveyance legally established against the captain or owner of a vessel authorized to fly the flag of one of the High Contracting Parties, or holding the license provided for in Section II, § 1, of Annex II, of the present Convention, shall entail the immediate withdrawal of the said authorization of license.

Article 26. The High Contracting Parties who have under their sovereignty, jurisdiction, protection or tutelage territory situated within the special zones, undertake, so far as each is concerned, to take the necessary measures to insure the application of the present Convention and, in particular, the prosecution and punishment of offenses against the provisions thereof, and to appoint the territorial and consular officers or competent special representatives for the purpose.

They will communicate these measures to such High Contracting Parties as shall have expressed the desire to be informed thereof.

Article 27. The High Contracting Parties agree that the provisions of Articles 16 to 26 inclusive and Annex II of the present Convention establishing a certain regime of supervision in the special zones shall not be interpreted, as regards such High Contracting Parties as have no territory under their sovereignty, jurisdiction, protection or tutelage within or immediately adjacent to the said special zones, either as constituting an obligation to apply the regime defined in the above-mentioned provisions or as involving their responsibility with respect to the application of this regime.

However, the said High Contracting Parties shall conform to the provisions of Articles 22, 23 and 25, which relate to the conditions under which native vessels under 500 tons (net tonnage) may be authorized to fly the flag of such High Contracting Parties.

CHAPTER IV. SPECIAL PROVISIONS

ARTICLE 28. Abyssinia, desirous of rendering as effective as possible the supervision of the trade in arms and ammunition and in implements of war, which is the subject of the present Convention, hereby undertakes, in the free exercise of her sovereign rights, to put into force, so far as concerns her own territory, all regulations which may be necessary to fulfil the provisions of Articles 12 to 18 inclusive of the said Convention relating to exports, imports and the transport of arms, ammunition and implements of war.

The High Contracting Parties take note of the above undertaking, and, being in full sympathy with the desire of Abyssinia to render as effective as possible the supervision of the trade in arms and ammunition and in implements of war, hereby undertake to conform to the provisions of the above-mentioned Articles so far as concerns Abyssinian territory, and to respect the regulations put into force, in accordance with the said undertaking, by Abyssinia as a sovereign State.

If a State, at present included in the special zones, should at the moment of its accession to the present Convention assume with respect to its own territory the same undertakings as those set forth in the first paragraph of this Article, and also, when such State possesses a seacoast, those contained in Articles 19 to 26 inclusive in so far as the same are applicable, the High Contracting Parties hereby declare that they will consider such State as excluded from the said zones from the date that its accession becomes effective as specified in Article 41 and that they will accept as regards

such State the obligations set forth in the second paragraph of the present Article, and also, when the State excluded possesses a seacoast, the obligations of Articles 19 to 27 inclusive in so far as they are applicable.

Article 29. The High Contracting Parties agree to accept reservations which may be made by Esthonia, Finland, Latvia, Poland and Roumania at the moment of their signature of the present Convention and which shall suspend in respect to these States, until the accession to Russia to the present Convention, the application of Articles 6 and 9, as regards both export to and import into these countries by the High Contracting Parties. These reservations shall not be interpreted as preventing the publication of statistics in accordance with the laws and regulations in effect within the territory of any High Contracting Party.

Article 30. The High Contracting Parties who possess extraterritorial jurisdiction in the territory of another State party to the present Convention undertake in cases where the rules of this Convention cannot be enforced by the local courts as regards their nationals in such territory to prohibit all action by such nationals contrary to the provisions of the present Convention.

Chapter V. General Provisions

Article 31. The provisions of the present Convention are completed by those of Annexes I and II, which have the same value and shall enter into force at the same time as the Convention itself.

Article 32. The High Contracting Parties agree that the provisions of the present Convention do not apply: (a) To arms or ammunition or to implements of war forwarded from territory under the sovereignty, jurisdiction, protection or tutelage of a High Contracting Party for the use of the armed forces of such High Contracting Party, wherever situated, nor (b) to arms or ammunition carried by individual members of such forces or by other persons in the service of a High Contracting Party and required by them by reason of their calling, nor (c) to rifles, muskets, carbines and the necessary ammunition therefor, carried by members of rifle clubs for the sole purpose of individual use in international competitions in marksmanship.

Article 33. In time of war, and without prejudice to the rules of neutrality, the provisions of Chapter II shall be suspended from operation until the restoration of peace so far as concerns any consignment of arms or ammunition or of implements of war to or on behalf of a belligerent.

Article 34. All the provisions of general international Conventions anterior to the date of the present Convention, such as the Convention for the Control of the Trade in Arms and Ammunition and the Protocol signed at St. Germain-en-Laye on September 10, 1919, shall be considered as abrogated in so far as they relate to the matter dealt with in the present Convention and are binding between the Powers which are Parties to the present Convention.

The present Convention shall not be deemed to affect any rights and obligations which may arise out of the provisions either of the Covenant of the League of Nations or of the Treaties of Peace signed in 1919 and 1920 at Versailles, Neuilly, St. Germain and Trianon, or of the Treaty Limiting Naval Armaments signed at Washington on February 6, 1922, or of any other treaty, convention, agreement or engagement concerning prohibition of import, export or transit of arms or ammunition or of implements of war; nor, without prejudice to the provisions of the present Convention itself, shall it affect any other treaty, convention, agreement or engagement other than those referred to in paragraph 1 of the present Article having as its object the supervision of import, export or transit of arms or ammunition or of implements of war.

Article 35. The High Contracting Parties agree that disputes arising between them relating to the interpretation or application of this Convention shall; if they cannot be settled by direct negotiation, be referred for decision to the Permanent Court of International Justice. In case either or both of the States to such a dispute should not be parties to the Protocol of December 16, 1920, relating to the Permanent Court of International Justice, the dispute shall be referred, at the choice of the Parties and in accordance with the constitutional procedure of each State, either to the Permanent Court of International Justice or to a court of arbitration constituted in accordance with the Hague Convention of October 18, 1907, or to some other court of arbitration.

Article 36. Any High Contracting Party may declare that its signature or ratification or accession does not, as regards the application of the provisions of Chapter II and of Articles 13, 14 and 15 of the present Convention, bind either all or any one of the territories subject to its sovereignty, jurisdiction or protection, provided that such territories are not situated in the special zones as defined in Article 12.

Any High Contracting Party which has made such a declaration may, subsequently, and in conformity with the provisions of Article 37, adhere entirely to the present Convention for any territories so excluded. Such High Contracting Party will use its best endeavours to insure as soon as possible the accession of any territories so excluded.

Any High Contracting Party may also, as regards the application of the provisions of Chapter II and of Articles 13, 14 and 15 of the present Convention, and in conformity with the procedure laid down in Article 38, denounce the present Convention separately in respect of any territory referred to above.

Any High Contracting Party which shall have availed itself of the option of exclusion or of denunciation provided for in the preceding paragraphs undertakes to apply the provisions of Chapter II to consignments destined for territories in respect of which the option has been exercised.

Article 37. The High Contracting Parties will use their best endeavours to secure the accession to the present Convention of other States. Each accession will be notified to the Government of the French Republic and by the latter to all the signatory or acceding States. The instruments of accession shall remain deposited in the archives of the Government of the French Republic.

Article 38. The present Convention may be denounced by any High Contracting Party thereto after the expiration of four years from the date when it came into force in respect of that Party. Denunciation shall be effected by notification in writing addressed to the Government of the French Republic, which will forthwith transmit copies of such notification to the other Contracting Parties, informing them of the date on which it was received.

A denunciation shall take effect one year after the date of the receipt of the notification thereof by the Government of the French Republic and shall operate only in respect of the notifying State.

In case a deunciation has the effect of reducing the number

of States parties to the Convention below fourteen, any of the remaining High Contracting Parties may also, within a period of one year from the date of such denunciation, denounce the Convention without waiting for the expiration of the period of four years mentioned above and may require that its denunciation shall take effect at the same date as the first-mentioned denunciation.

Article 39. The High Contracting Parties agree that, at the conclusion of a period of three years from the coming into force of the present Convention under the terms of Article 41, this Convention shall be subject to revision upon the request of one-third of the said High Contracting Parties addressed to the Government of the French Republic.

Article 40. The present Convention, of which the French and English texts are both authentic, is subject to ratification. It shall bear today's date. Each Power shall address its ratification to the Government of the French Republic, which will at once notify the deposit of ratification to each of the other signatory Powers. The instruments of ratification will remain deposited in the archives of the Government of the French Republic.

Article 41. A first proces-verbal of the deposit of ratifications will be drawn up by the Government of the French Republic as soon as the present Convention shall have been ratified by fourteen Powers.

The Convention shall come into force four months after the date of the notification of this proces-verbal by the Government of the French Republic to all signatory Powers.

Subsequently, the Convention will come into force in respect of each High Contracting Party four months after the date on which its ratification or accession shall have been notified by the Government of the French Republic to all signatory or acceding States.

In witness whereof, the above-mentioned Plenipotentiaries have signed the present Convention.

Done at Geneva, in a single copy, this seventeenth day of June, One Thousand Nine Hundred and Twenty-Five.

ANNEX I.

Statistical Forms. Form I.—Imports [1] into ..... (name of importing country) during the ..... quarter of 19—.

De cription[2] of arms and ammunition and implements of war according to the headings in attached schedule.	Countries of Origin						Total		
	A[3]			Z[3]					
	No. of articles	Weight	Declared value[4]	No. of articles	Weight	Declared value[4]	No. of articles	Weight	Declared value[4]
Totals									

EXPLANATORY NOTES

[1] The imports included in this table shall be the general imports of arms and ammunition and of implements of war set out in the attached schedule, arriving from abroad, *i.e.*, the total of the goods imported for home consumption, into warehouse, free zones, free ports and all other places excluded from the Custom-territory, also temporary imports, improvement trade, etc., but excluding goods for transit or transhipment.

When temporary warehousing pending transit or transhipment is permitted, arms and ammunition and implements of war arriving under these conditions shall not be considered as imports, provided that the consignments are accompanied by a license or similar document mentioned in Article 4 of the present Convention showing some other country as destination.

[2] Arms and ammunition and implements of war covered by Category I shall be tabled separately from those in Category II.

[3] Name of country which issued the license or similar document mentioned in Article 4 of the present Convention. But when the goods come from a Colony or Dependency, not issuing licenses in its own name, but having an autonomous Customs system, such colony or dependency shall be shown as the country of origin.

[4] In legal currency of the importing country. In cases where the values are the result of conversion on a gold standard basis, this fact should be expressly mentioned in the heading of this column. In all cases the value shall be shown, except in the case of samples referred to in Article 3, paragraph 3, of the Convention when it is not obligatory.

Form II.—Exports and Re-exports [1] from ..... (name of exporting country) during the ..... quarter of 19—.

Description[2] of arms and ammunition and implements of war according to the headings in attached schedule.	Countries of Destination						Total		
	A[3]			Z[3]					
	No. of articles	Weight	Declared value[4]	No. of articles	Weight	Declared value[4]	No. of articles	Weight	Declared value[4]
Totals									

EXPLANATORY NOTES

[1] The exports and re-exports included in this table shall be the general exports and re-exports of arms and ammunition and implements of war set out in the attached schedule leaving for abroad, *i.e.*, the total of the goods exported and re-exported from the internal market from warehouse, free zones, free ports and all other places excluded from the Customs territory, also temporary exports and re-exports, improvement trade, etc., but excluding goods for transit or transhipment.

When temporary warehousing pending transit or transhipment is permitted, the arms and ammunition and implements of war arriving under these conditions shall not be considered as imports provided that the consignments are accompanied by a license or similar document mentioned in Article 4 of the present Convention showing some other country as destination.

[2] Arms and ammunition and implements of war covered by Category I shall be tabled separated from those in Category II.

[3] Country in whose favor the license or similar document mentioned in Article 4 of the present Convention has been issued. In the case of an application by a mother-country on behalf of a Colony or Dependency having an autonomous Customs regime, such Colony or Dependency should be shown as country of destination.

[4] In legal currency of the exporting country. In cases where the values are the result of conversion on a gold standard basis, this fact should be expressly mentioned in the title of this column. In all cases value shall be shown, except in the case of samples referred to in Article 3, paragraph 3, of the Convention when it is not obligatory.

SCHEDULE

Category I. Arms, Ammunition and Implements of War Exclusively Designed and Intended for Land, Sea or Aërial Warfare.—Arms and ammunition and implements exclusively designed and intended for land, sea or aërial warfare, which are, or shall be, comprised in the armament of the armed forces of any State, or which, if they have been, are no longer comprised in such armament but are capable of military to the exclusion of any other use, except such arms, ammunition and implements which, though included in the above definition, are covered in other categories.

Such arms, ammunition and implements are comprised in the following twelve headings: 1. Rifles, muskets, carbines (number). 2. (a) Machine guns, automatic rifles and machine pistols of all calibers (number); (b) mountings for machine guns (number); (c) interrupter gears (number). 3. Projectiles and ammunition for the arms enumerated in Nos. 1 and 2 above (number). 4. Gun-sighting apparatus including aërial gun sights and bomb sights, and fire-control

apparatus (number). 5. (a) Cannon, long or short, and howitzers, of a caliber less than 5.9 inches (15 c.m.) (number); (b) cannon, long or short, and howitzers, of a caliber of 5.9 inches (15 c.m.) or above (number); (c) mortars of all kinds (number); (d) gun carriages (number), mountings (number), recuperators (number), accessories for mountings (weight). 6. Projectiles and ammunition for the arms enumerated in No. 5 above (number). 7. Apparatus for the discharge of bombs, torpedoes, depth charges and other kinds of projectiles (number). 8. (a) Grenades (number); (b) bombs (number); (c) land mines, submarine mines, fixed or floating, depth charges (number); (d) torpedoes (number). 9. Appliances for use with the above arms and apparatus (number). 10. Bayonets (number). 11. Tanks and armored cars (number). 12. Arms and ammunition not specified in the above enumeration (number or weight). Component parts, completely finished, of the articles covered by the above headings, if capable of being utilized only in the assembly or repair of the said articles, or as spare parts, should be entered separately, by weight, under each of the above headings or subheadings to which they belong.

Category II. Arms and Ammunition Capable of Use Both for Military and Other Purposes.—1. Pistols and revolvers, automatic or self-loading, and developments of the same, designed for single-handed use or fired from the shoulder, of a caliber greater than 6.5-mm. and length of barrel greater than 10 c.m. (number).

2. Firearms designed, intended or adapted for nonmilitary purposes, such as sport or personal defense, that will fire cartridges that can be fired from firearms in Category I. Other rifled firearms, firing from the shoulder of a caliber of 6-mm. or above not included in Category I, with the exception of rifled fireams with a "break-down" action (number).

3. Ammunition for the arms enumerated in the above two headings, with the exception of ammunition covered by Category I (number).

4. Swords and lances (number).

Component parts, completely finished, of the articles covered by the above headings, if capable of being utilized only in the assembly or repair of the said articles, or as spare parts, should be entered separately, by weight, under each of the above headings or subheadings to which they belong.

Annex II

Supervision within the special zones

Section 1. Supervision on Land

§ 1. All articles covered by Categories I, II, IV and V admitted into the territory of a State, colony, protectorate or mandated territory situated in the special zones, except such articles imported by individuals for their personal use under an authorization issued by the authorities of the territory concerned, shall be deposited by the importer at his own expense and risk in a public warehouse maintained under the exclusive custody and permanent supervision of the authorities aforesaid or their officials, of whom at least one must be a member of their armed forces, and who shall keep an official record of such deposit.

Every withdrawal from a public warehouse must be authorized beforehand by such authorities. No such authorization shall be given except for the purposes of transfer to another public warehouse or to a private warehouse duly approved by the said authorities or for delivery to individuals who have proved to the satisfaction of the said authorities that the articles are necessary to them for their personal use.

Articles required for the equipment of the national forces or for the defense of the territory are exempted from all formalities in connection with deposit in or withdrawal from a public warehouse.

§ 2. No private warehouse for articles covered by Categories I, II, IV and V shall be allowed within the special zones unless authorized by the authorities of the State, colony, protectorate or mandated territory. Such warehouse must consist of enclosed premises, reserved for that purpose and having only one entry, which must be fitted with two locks, one of which can be opened only by officials of the authorities. The person in charge of the warehouse shall be responsible for all such articles deposited therein and must account for them on demand by the authorities. Such articles must not be withdrawn from the warehouse nor be transported or transferred without a special authorization. The particulars entered on such authorizations shall be noted in a special register numbered and initialed.

Every arm imported under the provisions of § 1 by an individual for his personal use or transferred under the provisions of the same § from a public warehouse to a private warehouse or a private individual must be registered. A mark shall be stamped thereon if it does not already bear another mark or a number sufficient for identification. The mark or number shall be noted in the license to carry arms issued by the authorities.

§ 3. The manufacture or assembly within the special zones of articles covered by Categories I, II, IV and V is prohibited otherwise than in establishments instituted for the defense of the territory or maintenance of public order by the authorities of the territory concerned, or in the case of mandated territory by such authorities under the supervision of the mandatory Power.

The repair of such articles shall only be carried out in establishments instituted by the authorities or in private establishments which shall have been authorized for this purpose by the said authorities.

Section II. Maritime Supervision

§ 1. Cargoes of articles covered by Categories I, II, IV and V shipped on board the lighters, barges or coasting vessels referred to in Article 20, paragraph 3, must be covered by a special license issued by the authorities of the State, colony, protectorate or mandated territory in which such cargoes are shipped, and containing the particulars specified in § 2 hereof. All articles so shipped shall in addition be subject to the provisions of the present Convention.

§ 2. Special licenses referred to in § 1 of Section II of the present Annex shall contain the following particulars: (a) A statement of the nature and quantity of the articles in respect of which the license is issued (b) the name of the vessel on which the cargoes are to be shipped; (c) the name of the ultimate consignee; (d) the ports of loading and discharge.

Editor's Note: The remaining provisions of this section of the Convention relate to the licenses required for maritime supervision in the special zones. In the belief that these details are not of particular moment to American readers they are eliminated here. In the next issue of Army Ordnance we propose to publish the supplementary memorandum submitted to the Secretary of State of the United States, dated December 16, 1925, by Hon. Theodore E. Burton on behalf of the American delegation to the Conference.

Mobility and Speed—Aloft and Afloat

MOBILE ANTIAIRCRAFT BATTERY OF THE ITALIAN ARMY.
Modern artillery equipment massed in the Alpine section of Italy during recent military maneuvers.

ITALY'S NEW TORPEDO SPEED BOAT.
Capable of dodging its way through a convoying fleet, this boat points its bow at the target while the torpedo is slid over the stern. Traveling at high speed, the boat then turns out of the torpedo's path.

A Legend that Remains a Fact

A Review of Liddell Hart's Biography of Colonel Lawrence

By John M. Erwin*

IN his recent biography of Colonel Lawrence,[1] Captain Liddell Hart quotes from the Book of Proverbs: "Wisdom is the principal thing; therefore get wisdom; and with all thy getting get understanding." If he has set this goal for himself, he must look upon his last book with immense satisfaction, for in it he has compressed a formidable bulk of wisdom ornamented and illumined by a deep and refreshing understanding of military art as well as of his subject. To the great mass of us Lawrence has been a legend. At an age approximately the same as that of other men who did the actual dirty fighting in the World War, he rose to a pinnacle of eminence and romance undreamed of by them. There was no explanation offered, the accomplishment stood, and we wagged our heads in wonder. Now comes this study which lifts the spectral haze and reveals two things which we in our simplicity had never suspected. The first is that Lawrence had a deeper knowledge of war than any of the other commanders of the struggling armies. The second is that he had an ideal of honesty and of intellectual dignity that permitted him to employ his superb mental equipment without the distraction of personal ambition.

WHILE the future Generalissimo of the Allied armies had confined his studies to the German pundits, this young student of Archeology, Architecture, and Art had covered an astounding range of military reading, including the eighteenth century sources that Napoleon used as well as the most modern texts. The result was that, when Lawrence lay on his back ill in the Wadi Ais, he was able to reason from the sound base of this knowledge and to formulate a theory of command and of war which carried him through to the climax of his remarkable career.

His good fortune was unique in that he was left with a free hand by his own authorities and the peculiar nature of his forces and of his position gave him full scope to pursue his particular type of war, a war of movement designed to paralyze his enemy. Following the paralysis, he knew that the Turk would no longer have the will to fight. And the special limitations which hindered him, political, ethnological, geographical, he understood how to overcome. He had been contending with these matters for years, until incidentally he had come to know the Turks as well as his friends the Arabs. Knowledge of his enemy made a great reputation for Robert E. Lee; no commander can afford to ignore it.

But in considering the military aspects of this war in Arabia one interesting and important point stands out. It was not a war of annihilation; "the destruction of the enemy's forces" was not the aim. Lawrence made a point of avoiding battle and bloodshed, not from sentiment, but from policy. By directing his attacks against material he strangled the enemy forces and caused them to withdraw. A particular solution to a special problem arrived at by deliberate and careful reasoning. A contributing feature of his success, aside from his adept employment of the means at his disposal, was the effort he made to obtain personal knowledge of the situation that confronted him. He lost no opportunity of getting both wisdom and understanding.

The portion of this generation that returned from war are viewing in a bewildered way the doings of an alarming number of men who may some day be ranked as great; super drill sergeants with whole nations as their awkward squads. We are not accustomed to seeing leaders of genius retire to the cloister, and therefore we can hardly reconcile our experience with the actuality of Colonel Lawrence (or Aircraftsman Shaw). In our materialism we might explain his withdrawal to follow his own pursuits by saying that he has the wisdom to know when to quit. This, however, hardly matches the character of the man, his motive seems to lie deeper. His taste of power did not leave him an addict. Instead there set in a reaction during which he preferred to reflect in obscurity. Will Colonel Lawrence's Arabian exploits outlive his example of moral strength, of intellect and honesty? What a rare group of qualities this is! And when they flourish in a man capable of action, what a stimulant to the imaginations of soul starved economic units!

UPON looking back through the very respectable list of Captain Hart's works, it is difficult to decide whether his enthusiasm for his subject is a source of weakness or of strength. It certainly contributes to the interest which, attracts the naturally unreflective, while his unconventional and carefully reasoned attitude toward certain military practices appeals to the serious student of war. And thus very creditably is his audience increased. But in the masterly epilogue of this book in which the author gives his final appraisal of Colonel Lawrence, the argumentative reader will find much scope for his talent. He might summon history to his aid and, pointing to a long list of the astounding feats of able partisan leaders, advance the opinion that the conclusions regarding Lawrence's military ability are somewhat strained. Perhaps they are; it may easily turn out in the end that he will never be ranked with the world's great commanders. But that is immaterial; this study deals with a man of character and strength, equipped with a fine store of fundamental knowledge, who applies the full force of his splendid mental power to a nation at war. And in a remarkably short time he achieves his end. This clear eyed approach to the art of war is the motif underlying all of Captain Hart's works; we are too prone to let our minds be distracted by his delightful variations on the theme.

Liddell Hart is setting a very high standard in the field of military history. Painstaking research and constant application have broadened his outlook and enriched his style until he has definitely entered the realm of literature. And in this biography he has attained a charming result; the romance and the glory of the legendary Lawrence is left intact, somehow, in spite of this, the man lives, one likes him. One still delights in the legend, but he realizes to his astonishment that Lawrence is a fact.

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1Colonel Lawrence: The Man Behind the Legend. By B. H. Liddell Hart. New York: Dodd, Mead & Company. 1934. $3.75.

ARMY ORDNANCE

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Month by Month

BRIG. GEN. EDWARD M. SHINKLE, who assumes his duties as Assistant to the Chief of Ordnance of the Army September 1, 1934, is well known to many members of the Army Ordnance Association. On their behalf, indeed in the name of all members of the organization, we extend to him congratulations and best wishes. He leaves the Aberdeen Proving Ground, where he has served as Commanding Officer for the past five years, to assume the duties of Chief of the Ordnance Field Service succeeding Brig. Gen. Edwin D. Bricker. The Field Service of the Ordnance Department has a great responsibility. Upon its shoulders reposes the function of supply of ordnance equipment to the Army wherever located in peace and in war. It is axiomatic that the very best designed and speedily produced munitions in time of emergency are worthless if they are not in the hands of troops when and where needed. While our leanings at times may appear to be engrossed in the engineering and economics of war-time production, the fact remains that supply of equipment to the user is of identically the same importance.

GENERAL SHINKLE

Since the Field Service of the Department was established in the post-war reorganization, when it became coequal with the Manufacturing Service, its functions have been capably administered by officers whose efforts have merited the praise of the Army as a whole. Following the World War the first Chief of Field Service was Brig. Gen. George W. Burr. Brig. Gen. John W. Joyes next held the office as also did Brig. Gen. Samuel Hof. When General Hof became Chief of Ordnance in 1930 he was succeeded by General Bricker whose term—and it was one of splendid achievement—expires August 31st of this year when he will assume command of the Frankford Arsenal.

General Shinkle, a native of Ohio, began his Army career as a Cadet at the U. S. Military Academy in June, 1897, from which he was graduated in 1901. His first station was with the 30th Infantry at San Francisco, Calif., as a 2nd Lieutenant of Artillery. Later he served in Manila and returned to Presidio of San Francisco, with the 1st Battalion of Field Artillery until 1904 and with the Coast Artillery until 1906. His first service in the Ordnance Department was in the grade of 1st Lieutenant with station at the Sandy Hook Proving Ground. Subsequently he served at the Benicia and Frankford Arsenals and at Fort G. H. Wright. He received his majority in 1911 while at the Watertown Arsenal where he was stationed until 1914. From September of that year until May, 1917, he was in charge of the manufacture of artillery ammunition at the Frankford Arsenal.

When the United States entered the World War General Shinkle, then a lieutenant colonel, was ordered to duty in the Office of the Chief of Ordnance at Washington where he remained until June, 1918, as chief of the Artillery Ammunition Division. Later he was ordered to duty with the American Expeditionery Forces and returned to the Ordnance Office for duty with the Engineering Bureau and Artillery Ammunition Section of the Ammunition Division where he served until June, 1919.

He was graduated from the Army War College a member of the class of 1920 and assigned to the Picatinny Arsenal where he was in command until January, 1921. With the rank of lieutenant colonel he served as a member of the General Staff for three years, becoming Ordnance Officer of the 9th Corps Area in August, 1924. For the next three years Colonel Shinkle was in command of the Hawaiian Ordnance Depot. He was Executive Assistant to Maj. Gen. C. C. Williams, Chief of Ordnance, from September, 1928, to June, 1929, when he assumed his duties as Commanding Officer of the Aberdeen Proving Ground.

In recalling such a military record as this, one is impressed not only by the chronicle of individual service but equally by the system which equips its personnel with diversified experience and responsibility. An engineer, inventor and administrator, General Shinkle now takes over command of the supply, maintenance and repair functions of Ordnance Field Service.

All who are fortunate in his personal acquaintance undoubtedly have been impressed by his leadership. There is every reason to expect that the success which his predecessors have achieved in the administration of the Field Service will be his. In this expectation the Army Ordnance Association shares with full confidence. To General Bricker who relinguishes the command: "Well done."

WHEN Secretary of War George H. Dern, in presenting his views to the Military Affairs Committee of the House of Representatives, expressed the opinion that the increase in personnel of the United States Army then under consideration "is a very modest and proper one," he reflected a viewpoint with which all students of our national defense will agree. The increase of personnel contemplated by the bill would provide an officers corps of 14,000 and of enlisted men 165,000. These figures roughly are an augmentation of 2,000 officers and approximately 47,000 enlisted men. This proposed increase represents the views and best judgment of the General Staff based on studies over a period of ten years. It is the minimum strength necessary to carry out defense missions of the Army under its present peace-time organization.

THE ARMY'S NEEDS

Coincident with the Secretary's approval, former Secretary of War Newton D. Baker also appeared before the Committee in behalf of the proposed increase. He suggested that we should have at least one complete division of troops in each of the four armies. These divisions should be so closely associated that there would be ample regular training and sufficient personnel to carry on the services of planning, supply, experimentation, etc. When questioned by a member of the Committee as to his opinion whether the proposed increase would result in other nations enlarging their armies, Secretary Baker replied "I cannot imagine an expansion of our Army less than five times its present size which would have any effect on the military policy of any other nation."

Coupled with these significant statements, press reports have carried the news that considerable study and some action will be given to the proper defenses of the Panama Canal. The situation on the Isthmus has been brought into the public eye by visits of the President of the United States and the Secretary of War.

These developments tend to focus the public mind upon the needs of the Army as a whole both as regards personnel and matériel. Our traditional policy governing the number of individuals in the Regular Army has been and will continue to be to regard our professional force as a mere skeleton for war-time expansion. Whether or not there is such a thing as an emaciated skeleton the anatomists will have to say. Emaciated or not our Army is a skeleton and the cold figures of its present strength do not have a healthy glow when one considers the skeleton in terms of peace-time functions and war-time duties. The same may be concluded when we consider matériel, even though there has been notable improvement in the past year in the fields of mechanization and motorization. We have called attention in these columns on many occasions to the necessity for some sort of program which would place in the hands of our Regular troops sufficient quantities of modern equipment to allow them to train and maneuver in up-to-date fashion. Likewise there are strategic locations such as the Panama Canal where installations of fixed defenses and components of mobile armament are of extreme importance. Surely our Army at its present size should be up to date in fighting equipment and so should any increased force which may eventually be authorized.

The Secretary of War has done well in sponsoring this modest upbuilding of the Army. His distinguished predecessor of World War experience, Mr. Baker, can add two additional feathers in his already well-bedecked cap; one for his approval of this expansion and the other, a considerably larger feather, for his splendid work as chairman of the Baker Board which recently submitted its very commendable report on the Army Air Corps and the air defenses of the nation. From none of these developments need anyone draw the conclusion that militarists "are in the saddle" and that we are about to embark upon policies which depart from our historical attitude on national defense. They represent merely reorientation based on current conditions. At that they are a far cry from the standing army we thought we would need after the World War when a force of 22,000 officers and 560,000 enlisted men was recommended. Referring to the refusal of Congress to accept his post-war program, Secretary Baker said, "Subsequent events have shown that Congress was either wiser or luckier than I." We feel confident the next Congress will be representing a goodly majority of the people if it authorizes the increase of personnel and an augmentation of matériel which military authorities of the present and past unanimously deem to be required.

AT long last the chills and fever epidemic which has infected the promotion system of officers of the Regular Army is now being diagnosed and a proper cure prescribed. Not only have committees in the various arms and services been at work on their respective recommendations but individual officers, through the always helpful attitude of the *Army and Navy Journal* toward all service matters, are given an opportunity to ballot on plans of their choice. The enthusiastic returns in the *Journal's* poll can be ascribed to a more basic cause than the mere thrill of casting a ballot even though the officers of our Army, by and large, are quite unaccustomed to entering the voters' booth.

Promotion Plans

To say that promotion in the Army, due to the famous "hump," requires some major operation is to put the case mildly. On that score all are agreed. The difficulty will be in finding a method with the least objectionable features. We are not familiar with any of the plans thus far proposed except that of the Chief of Staff, General MacArthur, to which some publicity has been given. It is understood that many of the plans submitted include some forced attrition features usually in the form of selection out while others favor more inducements for volunteer retirements. The Baker Board in its recommendations regarding the Army Air Corps unanimously favored "a system of selection and retirement for officers of the whole Army similar to that now provided for the Navy and Marine Corps." In this connection it is of more than passing interest to recall that Maj. Gen. William Crozier, then Chief of Ordnance, presented such a plan some twenty-eight years ago. The plan was approved by the then Secretary of War and was embodied in a bill for Congressional consideration. There has always been some element of selection in connection with officers who serve in the Ordnance Department. For instance, by the Act of June 25, 1906, the officer personnel of the Ordnance Department was increased from 71 officers to 85 and at the same time it was enacted that details to the Department should be made from the Army at large from the grade in which the vacancy existed or from the grade below; that details should be made on the recommendation of a board of Ordnance Officers after at least one examination open to competition, and that the compulsary interval between details should be diminished from 2 years to 1 for officers detailed in grades below that of major and abolished altogether for the other grades. This law embodied a satisfactory method of recruiting and maintaining the Ordnance personnel and placed the efficiency of the Department in the hands of its own members. The present promotion impasse is of much broader meaning. In whatever form the plan appears finally—whether it be the MacArthur bill which aims to eliminate the hump by normal attrition and revised Class B methods, or a plan based merely upon forced attrition, or solely upon selection up, or solely upon selection out; whether it be some combination of the preceding three, or a separate promotion list for independent branches or whatever its form—if the adopted plan will remedy the present situation and do so with the smallest number of individual inequities for the benefit of the whole,

the changed condition will be reflected in morale. Morale and stagnated promotion can never go hand in hand. All friends of the Army will hope that stagnated promotion is selected out; by whatever fair process achieved it will mean selection up for morale.

AN ESTIMATE OF THE SITUATION

IN the July-August, 1934, issue of ARMY ORDNANCE there appeared an editorial, "Peace by Embargo," which has been the subject of some comment in the periodical press. This comment takes issue with our viewpoint as then expressed and with the editorial on the same subject which appeared in the *Chicago Tribune* and from which we quoted. From this comment one might conclude that any divergent opinion on the subject of arms embargoes arises from a selfish disregard of human rights of embargoed combatants or an equally selfish regard for arms sales. Neither conclusion states the principle as we see it; certainly neither was advocated by this Journal.

Peace by embargo of arms has come to the front in recent years and is held in some quarters as an efficient method for preventing war. The principle involved is worthy of debate especially since there seems to be a growing public opinion in favor of this method. It is not our purpose here to refute any arguments in favor of embargoes. It is of interest, nevertheless, to observe the trend of thought on the subject. It will be recalled that a first step in the embargo evolution, so far as the United States is concerned, was the proposed action early in 1933 when a resolution was considered by the Congress which would have placed an embargo on one or the other peoples at war but not on both. Happily such a policy was not adopted.

In the May-June, 1933, issue of ARMY ORDNANCE Hon. John Bassett Moore said that within the terms of the resolution then pending "Our Government would be asked to set itself up in rash and arrogant judgment upon the acts of other nations and on the merits of their conflicts, with a view to give or to permit military aid to one as against another."

The embargo now in effect by the United States on the supply of arms to both combatants in the four-year hostilities waging in the Grand Chaco is an entirely different thing. It prohibits supplies to both belligerents and is undoubtedly based on the highest humanitarian motives. As it does not play favorities neither country on the face of things can complain although the deprivations of both might possibly work to the disadvantage of one more than the other. This procedure is entirely proper under international law. The inhibition will not work, however, unless it is joined by all other producing countries. For all that, the experiment may be worthy of trial by expediency since neither combatant in the present instance is adjudged to be a major power from which major unfavorable consequences might ensue. These, however, are questions of policy and concerning them time will tell whether they are efficacious or not.

Such comment as has appeared in these columns on this subject is based on a more fundamental belief in the meaning of warfare, in the causes from which wars arise and in the means by which they are prevented or, if in being, stopped. The attitude may be a homely one but at least there are several thousand years of recorded history to verify it. This attitude simply stated is that war is an unwonted last resort—indeed the very last resort—for upholding national policy. Belligerents are belligerents not that they want war for war's sake but because one or the other is determined to execute a policy by imposing its will on the other. Real or fancy injustice is the basis on which both engage in battle and, in our homely and humble opinion, both will wage war as long as the injustice exists. Therefore it is quite illogical to contend that guns and ammunition cause the conflict or that the lack of them will end it. All of us know that no human disease, including the scourge of war, is cured until the infection is gone. To hold otherwise, in our opinion, is like blaming the surgeon's knife for the patient's pain. Hence while willing to reserve judgment on the value of preventing war by embargo, we reiterate the belief that human beings will continue to strive in this modern day for what they consider just, even if they must do so with the weapons of primitive man.

FORTUNE'S ARMS AND THE MEN

THE magazine *Fortune* in its issue of August, 1934, under the title "Unfinished Business" published the following:

"When FORTUNE last March published its article on the aims and methods of the armament manufacturers, it knew that it was laying itself open to misinterpretation. It knew also that this misinterpretation was almost as likely to come from the pacifist as from the bellicist.

"Misinterpretation there has been—this brief comment will hope to clear some of it up. But before we consider honest misinterpretations it is necessary to dispose of two of doubtful honesty.

"Beginning on page 361 of its issue dated May-June, 1934, the magazine *Army Ordnance* printed an article titled 'Facts About "Munitions Makers"—An Editorial.' This article is a passionate attack upon FORTUNE's article and either the publishers or their friends saw fit to reprint it immediately for free distribution. The accusation was that FORTUNE had unjustly attacked American munitions manufacturers; the editorial plea was for preparedness.

"With any opinions that the editors of *Army Ordnance* may hold upon the subjects of preparedness, national defense, and the like, FORTUNE is not concerned. But FORTUNE is concerned when these editors, in the course of making their points, put into FORTUNE's mouth words which FORTUNE did not say—which, in fact, express the direct reverse of what FORTUNE *did* say.

"Here is what *Army Ordnance* wrote: 'In its (FORTUNE's) March, 1934, issue a wealth of unsupported and unsupportable insinuation concerning United States and European "munitions makers" is spread on the record. It is not new for propagandists to build conclusions on the flimsiest kind of premises. For those who are interested in facts, we intend to set them forth here . . .

"'. . . What are the facts about the duPont Company, Bethlehem Steel, Midvale Steel, Colt's and Remington, the companies named by FORTUNE in its article, "Arms and the Men" as "perhaps the real heart of the armament business of the world?"'

"It is unnecessary to pursue the case built up by *Army Ordnance* upon this premise—for this 'quotation' never appeared in FORTUNE, nor did FORTUNE ever make any statement remotely resembling what *Army Ordnance* ascribes

to it. Fortune, having begun its story on armaments by describing the German house of Krupp, dismissed it by saying 'we must look elsewhere today to find the real heart of the armament business'; then asked the question: 'To the United States, perhaps?' And after two paragraphs dealing with the activities of the firms listed by *Army Ordnance*, it stated this conclusion (page 55, March, 1934): 'Our own country is not, then, quite so virginally innocent in this business as we might like to suppose. But despite the size of our armament bill, our armament and munitions exports to South and Central America and the Far East, we are essentially small fry in this game.' Although *Army Ordnance* never seemed to find this sentence, it devoted its editorial not only to proving it but, oddly enough, to deploring it. And at the same time, it deplored Fortune's lack of patriotism for having supposedly stated the reverse.

"Fortune's article, having dismissed the American munitions makers as small fry, never mentioned them again. The balance of its article was concerned entirely with the situation in England, France, and Czechoslovakia.

"In its May issue Fortune was equally explicit. Responding to a criticism by Author George Seldes, who complained that Fortune had minimized American munitions activities, Fortune said (page 192, May, 1934) that it would 'watch for Author Seldes' findings* with interest, but so far continues to doubt that when the American armament makers are viewed in a true perspective, their activities count for much in our general industrial scheme of things.'

"Fortune sympathizes with the American firms named by *Army Ordnance* that their case should have been pleaded in such a fashion and feels certain that they are not responsible for the word-twisting of their spokesman.

"ANOTHER interesting document stimulated by the publication of 'Arms and the Men' recently emanated from Paris. Breaking one of the most famous silences in Europe, a silence that has been traditional with them all their lives, the Wendel family, named by Fortune as 'the armorers of Europe', responded to Fortune's article by issuing an eight-page pamphlet denying some fifteen or twenty facts in 'Arms and the Men.' It denies for example that the family of Francois de Wendel has ever Germanized its name to *von* Wendel, as Fortune stated—a denial which it is interesting to consider side by side with the reproduction in the center of this page of the listing of the family taken from the 1873 edition of J. Siebmacher's *Grosses und Allgemeines Wappenbuch* (a sixty-volume compendium on heraldry, standard on the European continent). The German origin of this now French family is, of course, a matter of historical record.

"The most apparently challenging statement in the pamphlet is that the works of the firm known as Les Petits-Fils de Francois de Wendel 'have not, for more than 120 years, ever manufactured war material, nor have they at any time manufactured guns.' To which the answer is that Fortune never said they did. Fortune spoke of the Wendel *family*, never in the course of its article mentioned this company which was formed in 1871 to conserve the French interests of the Wendels when the Treaty of Frankfurt threw part of their holdings into Germany, part into France.

"It is quite true, and quite unimportant, that the firm Les Petits-Fils de Francois de Wendel does not engage in the manufacture of munitions. It is a company that owns and operates coal and iron mines in Lorraine—and, by its own admission, owns large, similar enterprises in Germany. These enterprises are the chief sources of the Wendel's great personal wealth and Les Petits-Fils de Francois de Wendel produces a wide variety of heavy-industry products. But anyone who supposes that the Wendel's interest in what can be made of iron and steel stops short with the operations of this company is naive indeed. As Fortune pointed out in its original article, Francois de Wendel holds, among many other offices, the presidency of the Comité des Forges de France, whose membership comprises 140 mining, metallurgical, and manufacturing concerns—of which a great number manufacture armaments. Let it not be forgotten that French firms, in 1931, manufactured armaments valued at over $300,000,000. How, then, the President of the Comité, himself one of the largest owners of coal and iron resources in France, who is connected by a dozen linkages with the huge armament firm of Schneider-Creusot,* can claim to have no interest in arms manufacture because Les Petits-Fils de Francois de Wendel does not make arms is a little difficult to see. The denial is simply an evasion upon technicalities and as such without significance.

"WHAT *is* significant is that the Wendel family should ever have published such a document. Obviously M. de Wendel and his family felt that they would improve themselves in the public eye by denying all connection with arms manufacture. Their antecedents, at least, felt no squeamishness on this point; the family coat-of-arms which was once embellished with a golden measuring rod is now embellished with a cannon. It is something new—and it may even be encouraging—when men of such power and position as the Wendels feel it advisable to disacknowledge their association with arms manufacture.

"In beginning its original article Fortune said: 'Anyone who talks about European armaments and their makers must inevitably oversimplify,' and added, 'But to oversimplify is not to overgeneralize.' Throughout its article it made every effort to avoid just that. Not all readers and commentators on the article have been equally careful; to organizations and individuals, whether personally or professionally interested in promoting peace, Fortune must address a warning. Fortune did not say, did not imply:

"(1) That armament makers are the sole cause of war.
(2) That if they were eliminated, war would be eliminated.
(3) That the situation it revealed in Europe had an exact parallel in the U. S.
(4) That this country should spend less—or more—upon national defense.

"The problems of war are altogether too complex to be dispatched in a single magazine article. Certainly Fortune does not believe the United States to be a provocative military power; certainly also it does not feel that a reduction in our own armament bill will have much effect upon the fearful race now being run in Europe. In common (it hopes) with intelligent people everywhere, it is bound to deplore the greater and greater sums that governments are spending on armaments. But what the facts in Fortune's article cried out against was a social-economic system so set up that individuals

*Referring to his book on armaments, *Iron, Blood and Profits*, then about to be published.

*Its director, Charles Prosper Eugene Schneider, has been a member of the Board of Directors of Les Petits-Fils de Francois de Wendel.

of great power may profit personally from the stimulation of international discord, from the instigation of war itself. Even an honest, patriotic manufacturer would find it difficult to remain strictly ethical under such circumstances. And the world is not made up exclusively of honest men. FORTUNE does not believe that any disinterested individual will take issue with this reasoning.

"FORTUNE does not know the answer to the armament question. But if the article stimulated the world in its search for the solution, that is encouraging. Meanwhile FORTUNE restates its own position as that of a reporter, not a crusader."

ARMY ORDNANCE herewith disclaims any intention of misinterpreting the *Fortune* article "Arms and the Men" and in so far as, in the judgment of the Editors of *Fortune,* it did so, it regrets that it did. This notwithstanding that many commentators, in public and in private, placed the same interpretation as ARMY ORDNANCE did upon *Fortune's* references to the munitions situation in the United States. ARMY ORDNANCE also regrets its use of the quotations of which *Fortune* complains, this notwithstanding that the sense of what *Fortune* actually said in words and by insinuation and what ARMY ORDNANCE said it said seem to be identical.

These disclaimers cheerfully made, there are one or two observations ARMY ORDNANCE feels justified in stating in its effort to keep the record clear.

(1) ARMY ORDNANCE, in its editorial "Facts About 'Munitions Makers'" was quite definite in the repetition of its statement that it is not a spokesman for any munitions manufacturer, actual or potential, here or abroad. In compiling the published figures of munitions activities of the five companies in the United States as named by *Fortune* ARMY ORDNANCE merely wrote to those companies, asked for the information and published what it had every reason to believe then and will always believe to be truthful and correct. *Fortune* could have obtained as easily and could have published as readily the same kind of facts had it really been interested in showing the smallness of the American fry.

(2) As to the claim (above) that *"Fortune's* article, having dismissed the American munitions makers as small fry, never mentioned them again," our copy of the March issue of *Fortune* does not bear this out. In the eighth paragraph following the small fry reference in our copy of *Fortune* we read as follows: "So much for Germany and her Krupp, the United States and Bethlehem Steel, England and Vickers-Armstrongs, and the now withered and senile Sir Basil. Do these armament businesses seem Big Business? Then you must alter your sense of proportion before you go further. All the foregoing is a mere curtain raiser to the Big Show. The Big Show is France."

(3) Our copy of the March issue of *Fortune* also contains the following paragraph* (the third from the beginning of *Fortune's* "Arms and the Men"): "Furthermore, American Business at its biggest and most secretive is today an open book compared with *any* European big business. Therefore what *Fortune* does not know about this subject would fill many a volume. But what *Fortune* does know is worth knowing; it is set down herein, not as argument or invective, but as elementary data. Some time, not too far distant, *Fortune* hopes to inaugurate a greater campaign (!) on this subject; let this article, then, be considered as no more than an opening gun (!!)." The exclamation mark following the word "campaign" and the two exclamation marks following the words "opening gun" in the above quotation are not *Fortune's* but ours. We hope we will not be accused of doubtful honesty or of word twisting in inserting them. We do so simply to emphasize what to us seems to be in contradiction of the last sentence of *Fortune's* "Unfinished Business" quotation above, viz., "Meanwhile *Fortune* restates its own position as that of a reporter, not a crusader."

For a timely discussion of other phases of *Fortune's* article "Arms and the Men" readers are referred to "Munitions Makers and Common Sense" by Hoffman Nickerson in this issue of ARMY ORDNANCE. As for the *Fortune* vs. ARMY ORDNANCE controversy, the incident is closed.

*N. B. This paragraph appeared in the March issue of the *Fortune* article; it was deleted from all copies of the much circulated pamphlet reprint of the article that have come to our notice.

PEACE HATH ITS HEROES

COURAGEOUS conduct is worthy of commendation wherever found, whether it be before the eyes of a watchful world or in the seclusion of the unseen round of duty. The greater is the commendation when it falls upon one who by personal ties had earned the admiration of all with whom he came in contact. Thus, to the memory of Capt. Clarence O'Leary, late of the Ordnance Department, U. S. Army, we record this slight tribute for his courage, devotion to duty and fearlessness in the very face of death.

Captain O'Leary—"Mike," as his friends will remember him—died at Fort Bragg, N. C., May 5, 1934. His death was the result of a tragic accident in the line of duty. The mere recital of some of the details bespeaks the fiber of the man. While investigating a recent theft of some small arms ammunition, Captain O'Leary, alone, was searching in one of the magazine areas of the reservation. Chancing upon a culvert, he noticed a bomb fuze detonator protruding from the earth. He pulled it out with a stick, examined it and while rubbing off the mud it exploded. Then was shown the iron nerve of Mike O'Leary. With his fingers torn away, with severe wounds to his chest, abdomen and face, and despite great pain and loss of blood, he walked some 100 yards to his parked automobile, started the engine and alone drove the car about a mile to the Post hospital. On arriving at the hospital he walked to the door and was carried to the operating room. He died four days later.

There is an old Latin adage that reads *age quod agis,* i.e., do what you are doing. Captain O'Leary is a striking example of it. His conscientious attention to duty in his effort to safeguard public property with which he was charged led to his death and, in the act of dying, despite his torn hands and mutilated body, he returned alone to headquarters.

Before the present magazines at Fort Bragg were built in 1924, defective ammunition was destroyed in this vicinity. It must have been that the fatal primer had lodged in the culvert for years. Despite its deteriorated condition and despite Captain O'Leary's long experience with ammunition this accident occurred. The passing of Captain O'Leary removes from the roster of the Ordnance Department and of the Army Ordnance Association a talented young officer with whose memory will be attached always his last great display of loyalty and courage. Indeed can we say of him as has been said for ages "Peace hath its heroes no less than war."

Facts About Munitions Makers, III

An Editorial

IN the series of editorials under this title which have appeared in recent issues of ARMY ORDNANCE an effort has been made to present some obvious facts which quite obviously are not understood by the general public. We propose to continue these discussions and hope ultimately to present a well rounded treatment of the munitions situation or, more accurately, the munitions problem in the United States. Although a factual presentation is always necessary to any reasoned judgment, we regret to say, the basic facts of our munitions problem are not always given due consideration by a great many critics. So if the case can be presented factually as we hope, then the wisdom of and need for industrial preparedness will, by logic and deduction from experience, prove the case. Interest in this series of editorials has been so great that we feel warranted in continuing on solely for the sake of the national defense.

It is difficult for those who are in any way familiar with our munitions problem to account for the vigorous flank attack now being waged in many quarters. Criticism of the old order is the vogue; it seems to embrace everything connected with the so-called capitalistic system in broad terms as well as in detailed application. For example, one great complaint about munitions making is leveled at profits arising from the manufacture of arms. Granting that there may have been and undoubtedly were profits made by manufacturers of armament during the World War, we fail to see the justice of pinning the label "profiteer" upon the arms makers individually or as a class to the exclusion of everyone else and other groups. If excessive profit is to be eliminated in time of major emergency—and undoubtedy it should be—then in the words of Mr. Bernard M. Baruch, World War Chairman of the War Industries Board, "Each and every thing and dollar and each man and woman shall share equally the burdens." That is the only sane approach. All prices for goods, food, rents, wages, services—indeed all activities that yield profit—must be controlled. Most assuredly those who will engage in the production of munitions in any major war in which the United States may become engaged to a man will subscribe to this principle. On the other hand, to build a case, as so many critics are now doing, by singling out the armament maker as the profiteer to the exclusion of all others is pure, unadulterated sham. Why, may we ask, is the ignominy placed upon the armament maker only when every other branch of war activity is subject to the same charge? Why—unless there be some ulterior motive aimed at the national defense which is not apparent on the face of the record? If profits are the point at issue the cotton planter, the wheat grower, the clothing manufacturer, the food producer, the real estate operator and so on through the whole category of business and service, all were equally at fault during the World War.

EQUITABLE war-time control of goods and services is a question of economics on which the trained economist is best equipped to do the talking. Mr. Baruch and others like him by training and experience, are so equipped. The Baruch plan for freezing all prices and the imposition of an excess profit tax is one of striving to make the burdens of war equal upon all. Another was proposed by the War Policies Commission in March, 1932. After an exhaustive study of the subject, the Commission recommended that until a constitutional amendment be adopted clearly defining the power of Congress to prevent profiteering and to stabilize prices in time of war that the President be empowered in time of war "to institute a program under which prices may be stabilized and thereafter adjusted to such levels as will minimize inflation and will secure to the Government the use of any private property needed in the prosecution of war without affording the owner thereof profit due to the war." The Commission further recommended "In addition to all other plans to remove the profits of war the revenue law should provide that upon any declaration of war and during the period of such emergency, individuals and corporations shall be taxed 95 per cent of all income above the previous three year average, with proper adjustments for capital expenditures for war purposes by existing or new industries." Other qualified students of the question contend that a system of priority licenses controlled by the several administrations similar to those in operation in the United States at the close of the World War would be equally effective. Still others contend that a war-time N. R. A. would do the job equitably. At all odds these considerations are matters of policy on which the trained and experienced economist must be the guide. Whatever the method all will agree that excessive profit by any individuals or any groups must be anathema. By the same token, all clear-headed individuals will marvel at those who damn the arms maker in time of war as an infamous, profiteering, blood-thirsty devil, meanwhile picturing, if he is brought into the discussion at all, the cotton planter and the wheat grower and the rest as the only patriots in the crowd. Be that as it may, excessive profit cannot and should not be allowed to anyone or any group in another major war.

But there is something which is even more fundamental. There is only one reason why any people, any where, at any time ever waged war. What was that? To win. This fact must not be overlooked when we discuss military supplies in time of war. It has been very well stated in the foreword to the Industrial Mobilization Plan approved by the Secretary of War and the Secretary of the Navy in February, 1933. We quote: "In formulating this plan the recommendations of the War Policies Commission of March 5, 1932, have been taken into consideration. The tendency to over-emphasize administrative efficiency and under-emphasize national effectiveness has been guarded against. The objective of any warring nation is victory, immediate and complete. It is conceivable that a war might be conducted with such great regard for individual justice and administrative efficiency as to make impossible those evils whose existence in past wars is well known. It is also conceivable that the outcome of a war so conducted might be defeat. In all plans for preparedness and policies to be pursued in event of war it must never be overlooked that while efficiency in war is desirable, effectiveness is mandatory." We may complain logically at the clumsiness of ill-prepared effort and injustice, but the ultimate purpose—victory—is the pearl of great price.

NOW let us look at our munitions record of the World War. The ordnance or munitions problem of those days finds an exact parallel with but one exception today. That exception is a major one, namely, we now have industrial war planning under the National Defense Act of 1920. We now have plans for effecting the great transition of the industry of the nation from a peace to a war footing. We now know what materials will be required and in what quantities and at what rates of delivery. We also know where and by whom we expect to have them made. Other than this the United States as a peace-time munitions producer is about in the same boat in which she paddled along in 1914. In pre-war days military ordnance, with the exception of small arms, was produced in six Government arsenals and two private plants. Today ordnance material is produced in six Government arsenals and a few private plants. Here we digress to call attention to erroneous statements often made about arsenal and private manufacture of ordnance in peace time. For example, Mr. Shepard Stone writing in the *New York Times,* Sunday, April 29, 1934, made this statement while commenting on the fact that in the United States no arms producing company dominates the field as completely as in some of the European countries. Mr. Stone wrote "95 per cent of the ordnance of the United States War Department, however, is supplied by private firms." We do not have the figures available of the percentages but we venture to say that had Mr. Stone checked his statement he would have found it 100 per cent wrong. Indeed the record would show, we believe, that in a normal peace-time year 95 per cent of the ordnance of the United States War Department is supplied by Government arsenals.

But to get back to the record. How was this transition of peace industry to war production effected? Lest the country forget, the story should now be retold in the words of one of the few people best qualified to tell it. Before we do that let us get in our minds some visualization of the problem at the start. Let us take one ordnance item alone: the artillery required for an army of 5,000,000 men. Let us remember that in thirteen years the Government arsenals had produced exactly as many guns of one caliber called for in that program as had to be produced each month. Let us remember too that with certain other calibers not a single gun had ever been produced in the United States; for these there was not even a design, not so much as a gun on paper. Now let us listen to the words of the man who served as Chief Ordnance Officer of the A. E. F. and later as Chief of Ordnance of the Army during 1918 and for twelve years thereafter. It is the statement of Maj. Gen. C. C. Williams made in 1920, published in "The Story of Ordnance in the World War" by Capt. Sevellon Brown. It was addressed to the 6,000 commissioned officers who served in the Ordnance Department during the World War and is in the nature of a farewell charge by the commanding general. This is the story in General Williams' words:

"THE problem of Ordnance in the World War was the problem of mobilization and coördination of science and industry with the military establishment. The scope of our effort was as broad as American industry, and it reached to the foundations of scientific research and knowledge. Although the Ordnance Department did not monopolize either field, it is safe to say that no other component of the war machine carried its responsibilities and effort as to design and invention, or production, into so many channels, or projected them upon so vast a scale.

"Our undertaking was, indeed, at once so varied and so prodigious that few persons could possess the knowledge to pass judgment upon it intelligently. I remember upon one occasion listening to the complaint of a fellow officer anent the lack of sympathy entertained by the public for the work of our corps. It was during the days that the Browning gun was 'on paper.' Another officer present picked up from my desk a paper-weight made of a seventy-five millimeter shrapnel shell cross-sectioned. Turning the smoothly machined exterior of the steel-jacketed shell toward him, he said, 'General, this is what the public sees of our product. But this is what that product really is.' Quickly he turned toward him the cross-section revealing the interior mechanism of the shell; seventy-three component parts made with all the precision and delicacy of a watch.

"But not only must we expect the public to fail in understanding of the scope and difficulty of our work. Do we not know, ourselves, from actual experience that extremely few officers of the corps could embrace the entire field; could give of their own knowledge a worth while opinion of how well or how poorly we measured up to the whole job. Each man knew his own specialty; knew the progress of his branch, section, division, or plant, or the few items of matériel included within his work. But only an extremely few could view the entire field, from tanks and tractors through field artillery and railway artillery, trench mortars, pyrotechnics, small arms and grenades to clinometers, alidades, protractors, steel helmets and harness. When your problem is the production of 200,000 separate components in more than 5,000 different plants, with those parts or items ranging from feed bags and star shells to complete trains of railway artillery, the judge who can competently say what your progress has been must indeed have a profound knowledge of the field.

"IT was my fortunate experience to view the work of our corps both in France and at home. For the first ten months of the war I was with the American Expeditionary Force. For the rest of the time it was my duty to keep in constant review the fruits of your labor at home. Of such knowledge I say that you did exceedingly well and that I am proud to have worked with you in this war.

"I say this utterly without thought of any personal responsibility for that success. The tribute is not to me. It is not alone to the Army Ordnance Department of the regular establishment nor to the Ordnance officers of the Temporary Army. It is to American industry and engineering, to American science, that the credit for this achievement must be given. It was American industry and science that were on trial. The ninety-seven officers of the Ordnance Department of the regular Army and the government arsenals they administered could never have dominated this work; have won the success or caused the failure of the 5,000 officers from civilian life and the 5,000 private industrial plants that were incorporated in the organization for the period of the war. The enlistment of industry, equally with the draft of manpower, was a success. And for that I thank you, the administrative directors and the engineering advisors of American industry who came into the service of the Ordnance Department during the war.

"It is probable that the Army Ordnance Department exercised direction over a greater physical power than was

ever concentrated upon a single purpose in the history of the world. The happy attainment of our objectives in the war within nineteen months gave insufficient time for the complete development of that power. Proper strategy required the projection of the Ordnance program upon a scale designed to secure an ultimate, overwhelming and continuous rate of production rather than a lesser rate of production at an earlier date. Obviously a housewife could buy an oven and bake six loaves of bread in less time than a bakery could be built and provision made for the needs of an entire city. But the rate of production from the housewife's oven would never feed the city. The Ordnance objective was a rate of production adequate for an Army of 5,000,000 men. That program was dictated to the Ordnance Department by the General Staff in accordance with its man-power program. To win that objective we had to allot time for the building of plants capable of such rate of production. We had to obtain designs and even, where necessary, discard existing designs, to get manufacturing methods on a basis permitting of such rate of production. We could not sacrifice production in 1920 to force a quicker but lesser rate of production in 1918. We were building to make ultimate victory absolutely certain and there never was a moment when the Ordnance program did not guarantee the ultimate defeat of Germany.

"Under such a policy it was inevitable that the attainment of victory within nineteen months would leave the Ordnance program unfinished in certain respects. However, within that period we effected the complete mobilization and perfected the coördination of science and industry with the war machine, we produced munitions of certain classes in unprecedented quantities, we developed and supplied matériel of such superior design as to receive the praise of our allies and the acknowledgment of our foes and we stood ready, during the month the armistice was signed, to turn on the taps at full force that had been made ready to provide a flow of munitions such as no nation had ever attempted. The fact that the American munitions program alone was greater than that which Germany could attempt after thirty years of preparation for war is apparently little realized in this country. But I have no doubt that it was realized in Germany and that such realization contributed to victory by its reaction upon the military masters of the German empire.

"I repeat, this achievement and this contribution to victory is more largely to be laid to man-power and brain-power mobilized in the service of the Ordnance Department than to any other single source. Your reward for service to country might well be in your realization that your ability was a part of the composite mind which, at the moment of victory was bringing forth the strength of thousands of industrial plants and the might of millions of American workmen and workwomen, to transmit that incalculable force three thousand miles overseas to Chateau Thierry and St. Mihiel. Nor could the power of our country have been made effective except as this composite mind harnessed science and industry in the service of the war machine.

"THE design of Ordnance is a highly specialized science and its production a highly specialized industry. As a science it possesses a history of research and experimentation that reaches back hundreds of years beyond the earliest dates recorded in other fields of scientific knowledge applied in modern industry. The mastery of Ordnance design requires a command of that mass of scientific fact. It requires the devotion of a life-time of study and research to the science and it is utterly impossible to improvise a master in Ordnance design, no matter how well equipped with general scientific or engineering knowledge your candidate may be. In the United States knowledge of the science of Ordnance was confined to a very few men, hardly more than a score were available for the design of Ordnance who could qualify as experts in the broad field it was necessary to cover.

"THE art and industry of Ordnance production was equally restricted in the United States before its entrance into the war. The production of Ordnance matériel, with the exception of small arms, was practically limited to the six government arsenals and two private plants. How restricted a field of production this was is shown by the fact that at the time of the signing of the armistice there were 5,000 plants throughout the United States working on direct contracts for the production of Ordnance matériel. The restriction was the greater also because conditions and methods in the government arsenals differed so greatly from those obtaining with private enterprise.

"The problem of the Ordnance Department was to nationalize this specialized science and industry, to apply it in a field where it could absorb and employ the knowledge and talent of scientists, engineers and industrial experts from all sections of the country and from many different channels of industry. That was the first and most difficult step. That accomplished and the directing organization established, it was possible to concentrate the incalculable power of industrial America upon the production of munitions for the winning of the war.

"How was this accomplished? By the devotion to duty of the six thousand commissioned officers who served during the war in the Ordnance Department. As I have said it is impossible to improvise an Ordnance expert. Engineers who had won fame and success in private enterprise and were masters in their field came into the Ordnance Department, frequently with a rank far below their deserts, and willingly confined their effort to some task proportionate to but a fraction of the problem they had mastered in their own field. Without hope of proper reward they labored to make whatever contribution they could to their country's cause. Thus we secured our improvised 'experts' in ordnance design, by squeezing within a narrow compass in the field of our specialty the broad and commanding knowledge of these scientists and engineers from other fields.

"From the industrial field we received a generous contribution of the best ability of the country. Men came to unfamiliar tasks, to buy and procure unfamiliar materials in markets where no supply existed. Without a lamp or a ring they had to produce Aladdin's genii to bring forth these hundred thousand separate items of fighting matériel. They had to provide plants, to teach methods which they, themselves, often had to learn anew. The personnel had to be improvised to care for the inspection of this prodigious volume of varied material, to prove it with firing tests at Aberdeen and elsewhere, to develop it from the first model through to the point of successful quantity production. The intricate problem of supply to armies in the field had to be worked out, largely by a personnel new to the task.

"When I survey the extent of that labor you performed in your country's interest, I deplore the inadequacy of any tribute it is within my power to pay your splendid service. . . .

"I WANT also to speak of the future. Your labor was no less for the security of your country in the emergency now passing than for its safety in the future. For if we happily have ended wars by the winning of this one, your contribution to that victory has given your country security; and, if war hereafter should prove unavoidable for our country, then the lesson you have learned, the knowledge you have acquired in your labor, should safeguard the nation against the danger of ever again entering upon a great war without knowing how to shift industrial power quickly to war channels. With the ability to effect that transition quickly, with adequate provision for it made in advance of the emergency, I should never fear for the safety of our country. But lack of preparedness in that respect will ever be our country's greatest weakness and gravest danger so long as the possibility of war exists. Avoidance of that danger lies largely in the possibility of continuing a proper contact between that branch of the military establishment charged with the provision of munitions and the industrial world. If that contact is to be maintained it must be largely through your interest.

"Therefore, I ask you, when you return to civil life, strive to retain a consciousness of this problem we have faced together during the war. You have come to realize that as scientists, engineers, directing forces in the field of industry, yours is the command of a source of power that is vital to your country in time of war. Stand ready to return to your posts and so keep fresh your interest in the military establishment, especially as regards its contact with industry, that you will always be an influence to keep your country prepared for the transition whenever it becomes necessary."

THIS stirring statement by General Williams needs no commentary for those who want to visualize our war-time munitions problem. His analysis will be, as it has been, accepted both for its narrative of munitions achievement and its statement of munitions policy. If, perchance, over-taxed memories require more detail let us complete this presentation by recalling the record of only one item of our World War munitions program, that of artillery production. Although war had been declared in April, 1917, the first appropriation for artillery construction was not passed by Congress until June and all the funds required were not available until October—six months after our entry into the war. It was some seven months later that the transition for artillery production began to be effective. On July 26, 1918, an announcement was made by the Ordnance Department that fifteen of the sixteen gun plants for the forging and machining of cannon were completed at a cost of $34,768,297. And these plants were but a preliminary to the production of one part of a complete weapon which includes, in addition to the gun itself, the carriage and the complicated recuperator and recoil system. These plants were capable of producing cannon or cannon forgings for mobile artillery from 1½ to 10-inches in caliber. Not one of the companies operating these plants had ever been engaged in ordnance manufacture but all successfully met the rigid requirements despite delays of weather conditions, traffic, and pressure on the machine tool industry upon which heavy demands were being made. On August 23, 1918, the Department issued a second statement saying that 19 of 26 plants for the production of gun carriages and recoil mechanisms were completed and in operation. The 7 other plants were nearly ready to begin operations. To provide these plant facilities for carriages and recoil mechanisms $24,837,336 were expended. At that time the cost of providing facilities for the production of artillery—guns, carriages and recoil mechanisms—was $99,606,633, not including limbers, caissons and ammunition wagons. This historic statement continued: "As was the case with the gun plants, a new industry had to be created for the production of gun carriages. The problem of carriage production in America was even more difficult than that of forging and machining cannon. For example, the carriage of the 240-mm. howitzer, the most complex of carriages, comprises about 6,000 separate pieces, exclusive of rivets. The carriage for 155-mm. guns or 155-mm. howitzers, comprises between 3,000 and 3,500 separate pieces, exclusive of rivets.

"All of the twenty-six gun carriage plants are in operation, even those that took over the production of French models. The building of French model carriages in this country necessitated special arrangements with the French government, the procurement of French drawings of all parts of the carriages, the translation into English measurements of those drawings, the selection of plants to manufacture the carriages, the building of new shops, the manufacture and installation of special machinery, even the building of special machine tools with which to make the machine tool equipment of the carriage plants, the standardization of manufacture to such a degree that any part produced in any plant should be interchangeable with any similar part produced in any other plant, and all parts produced in American plants should be interchangeable with similar parts produced in French plants."

SUMMED up all this means that in the summer of 1918 the munitions program of our Army included the practical completion of a new $100,000,000 industry as a preliminary to the manufacture of artillery. And it was a new industry from start to finish: new operating organizations, new processes, new machine tools, new and unfamiliar designs. Was there an element of profit? Undoubtedly there was. Was much of it recaptured by an excess profit tax? Undoubtedly it was. Was the transition of peace industry to war industry accomplished? Undoubtedly it was. Must we follow the same principle should war ever make necessary another major munitions program? Undoubtedly we must. If because of elusive profits it should be decreed otherwise, we had better embark here and now on the spending of millions—indeed, billions—of dollars on the building of several thousand government plans, manning them with thousands of competent engineers and artisans—all remaining in standby condition until another war may come. By that time, in the very remote future all will hope, the cost will have become so impossible, the buildings and equipment so obsolete, the engineers and artisans so rusty for want of something to which their talents could be applied that we will perforce start again as we did in 1917 to do the job as it should be done.

From these facts the why and wherefore of industrial preparedness and of munitions making as we have it in the United States today, should need no further comment. If wars must be, let our munitions problem and the solution the World War taught us be accepted national policy. When we talk of excessive profits let us plan to prohibit them to everybody, share and share alike, but let us not forget that "in all plans for preparedness and policies to be pursued in event of war it must never be overlooked that while efficiency in war is desirable, effectiveness is mandatory." Sheer blindness to these crucible-born facts would be profitless indeed.

Association Affairs

Election of A. O. A. Officers and Directors

COL. HARDEE CHAMBLISS, Ord. Res., at the request of the President of the Association, will serve as chairman of the Committee of Tellers to canvass the ballots for the election of officers and directors of the Association. The other members of the Committee of Tellers who have been requested to serve are Lieut. Col. Henry P. Erwin, Ord. Res., and Lieut. Col. Robert P. Parrott, J. A. G. Res. This committee is in accordance with paragraph 23 of the By-Laws of the Association which provides: "The President shall, on or before July 31st of each year in which elections are to be held, appoint three tellers of Election of Officers whose duty shall be to canvass the votes cast and certify the same to the President or Presiding Officer at the first subsequent session of the Board of Trustees. The term of office of the Tellers shall expire when their report of the canvass has been presented and accepted."

Ballots were mailed during the latter part of July to all members entitled to vote. They must be received at the offices of the Association before noon Tuesday, September 4, 1934, when the polls will close. Members who have not yet sent in their ballots are urged to give particular attention to the procedure printed on the ballot. It is necessary under the By-Laws that the outer envelope containing the ballot also contain the name of the voter. Only through this means can the voter be declared eligible and his ballot certified to the Committee of Tellers of Election.

Ordnance District Activities

MAJ. GEN. WILLIAM H. TSCHAPPAT, Chief of Ordnance, was the principal speaker at the annual meeting of the Hartford Ordnance District last month. The meeting was entirely successful and the attendance indicated a sustained interest in industrial preparedness activities in the district. Col. Frederick H. Payne, former Assistant Secretary of War, who is now back in the ranks as Assistant District Chief, and the following members of the Advisory Board and Metallurgical Advisory Committee of the District addressed the gathering: Mr. D. K. Crampton, Mr. Edwin Pugsley, Mr. S. M. Stone, Mr. W. R. Webster and Maj. J. K. Clement, Ord. Dept.

During mid-June the student officers of the Army Industrial College, Class of 1934, made their annual inspection trip to Pittsburgh, Pa. The itinerary for the class included visits to the following plants: Mesta Machine Co., Westinghouse Electric Manufacturing Co., Jones and Laughlin Steel Corp.; Mine Safety Appliances Co. and to the Mellon Institute. Maj. W. L. Clay, executive officer of the Pittsburgh Ordnance District, was in charge of arrangements and was highly commended by the Director of the Industrial College for the efficient manner in which he handled all details. Members of the Army Ordnance Association who attended the annual meeting held in Pittsburgh last December will recall with thanks Major Clay's splendid management of the program on that occasion.

Several changes of unusual interest have occurred in the roster of executive officers of four Ordnance Districts. Maj. R. L. Maxwell, a graduate of the Army War College, Class of 1934, and formerly Secretary of the Army Ordnance Association and Editor of this journal, has relieved Maj. W. L. Clark as executive officer of the Philadelphia District. Major Clark is now on duty in Washington as Chief of the War Plans Section of the Manufacturing Service. Maj. A. B. Quinton, Jr., formerly a member of the faculty of the Army Industrial College, is the new executive officer of the Detroit Ordnance District, relieving Maj. R. N. Bodine who is now stationed at Fort Sill, Okla. Maj. Oscar Krupp, who was graduated from the Army Industrial College this year, is the new executive officer of the Cincinnati District. His predecessor in that office, Maj. C. A. Walker, is now the Executive Assistant to the Chief of Ordnance. Capt. L. J. Dillon has been relieved as executive officer of the St. Louis District and is now on duty in Hawaii. Capt. H. M. Reedall, a member of the class of 1934 of the Army Industrial College, is now on duty in the St. Louis District.

William H. Bassett

WILLIAM H. BASSETT, a member of the Army Ordnance Association, metallurgical manager of the American Brass Company, and an international authority on non-ferrous metals, died at his home in Cheshire, Conn., on July 21st. Born at New Bedford, Mass., Mr. Bassett was graduated from the Massachusetts Institute of Technology in 1891 and became a chemist and later superintendent of the Pope's Island Manufacturing Company. Five years later he taught chemistry at Swain Free School until 1900 when he was appointed chief chemist at the Newark Works of the New Jersey Zinc Company. In 1902 he was the chemist for the Coe Brass Manufacturing Company.

Mr. Bassett's lengthy service with the American Brass Company began in 1903 when he assumed his duties with that company as chief chemist and metallurgist. In 1912 he became technical superintendent and metallurgist, and in 1930 metallurgical manager. His work in the field of chemical analysis of copper and its alloys, in the elimination of waste and brass manufacture, in the preparation of standard specifications for non-ferrous metals, and the application of laboratory control to manufacturing operations are an important part of the modern development of American industry.

For the commercial and professional organizations with which this great technician and administrator was identified ARMY ORDNANCE expresses its share in their loss. Mr. Bassett had a keen appreciation of the importance of the metallurgical industry to the national defense and was of material aid and untiring service in the solution of its problems. To his family and his associates of the company, itself a leading exponent of industrial preparedness, ARMY ORDNANCE extends its sympathy.

Necrology

SINCE publication of the last issue of ARMY ORDNANCE notice has been received of the death of the following members of the Association: Lieut. William B. Bader, Buffalo, N. Y.; Joseph B. Card, Chicago, Ill.; and Capt. J. A. Wiliners, Harrisburg, Pa. To relatives and friends of these deceased members ARMY ORDNANCE, for its readers, extends condolences.

New Members

THE following have been admitted to membership in the Army Ordnance Association since the last issue of ARMY ORDNANCE: Leslie M. Barnes, Santa Cruz, Calif.; Robert J. Belknap, Parlin, N. J.; F. M. D. Bottenfield, Allentown, Pa.; E. S. Chickering, Oil City, Pa.; R. A. Daugherty, Escalante, Utah; J. B. Ehman, San Francisco, Calif.; L. J. Ertle, Pittsburgh, Pa.; William R. Hewlett, San Francisco, Calif.; T. T. Holme, Philadelphia, Pa.; Kenneth H. Klipstein, Bound Brook, N. J.; L. E. Limbert, East Orange, N. J.; H. C. C. Martin, Glen Rock, N. J.; T. H. Milliken, Bethlehem, Pa.; G. W. Outland, Washington, D. C.; David H. Smith, Brooklyn, N. Y.; Charles W. Thomas, Rodeo, Calif.; William B. Todd, Pittsburgh, Pa.; Evan A. Watkins, New York, N. Y.; E. Alban Watson, Lynchburg, Va.; William E. White, Edge Moor, Del., and D. G. Williams, Allentown, Pa.

Professional Notes

BERYLLIUM COPPER

AN investigation is under way by the Ordnance Department, U. S. Army, to determine the physical properties of copper containing approximately 2 to 2¼ per cent beryllium. Beryllium copper is a new alloy with physical properties which can be changed by heat treatment. One of the advantages of this alloy is its reported high endurance limit which is a desirable factor in the manufacture of firing pins and strikers. Stock is on hand hardness of which runs approximately 200 Brinell. The effect of heat treatment upon the hardness and tensile properties of this material are being determined.

STAINLESS ALLOY FOR A.A. RECUPERATORS

THE thermal and mechanical behavior of 18-8 stainless alloy when used for recoil and recuperator cylinders of 3-inch antiaircraft guns are under test. Previous observations were made under conditions which could not be considered normal. The conditions of this later test were normal. It was found that 18 per cent chromium—8 per cent nickel variety of stainless alloys was not a suitable material for cylinders of 3-inch antiaircraft recuperator mechanisms. After only 3,000 gymnastications the mechanism failed due to excessive oil leakage. It was found that not only was the recoil cylinder badly scored but also the recuperator cylinder in the zone of travel of the piston.

The heating of the recoil cylinder due to gymnastication can be related to the number of cycles by means of the parabolic equation

$$\frac{\text{T. R.}}{\text{(18/8—15° C. rm. temp.)}}^2 = 1.47\ C \quad (5.2\ \text{c/min.})\ \text{up to 500th cycle}$$

and

$$\frac{\text{T. R.}}{\text{(18/8—18° C. rm. temp.)}}^2 = 2.0\ C \quad (4.9\ \text{c/min.})\ \text{from 1000th to 1350th cycle}$$

where T.R. equals temperature rise and C equals cycles elapsed during heat run and subscripts refer to metal, the room temperature and rate of gymnastication. The constant 1.47 is considerably greater than the constant for monel metal obtained under similar conditions and is indicative of less satisfactory material. Indications are that antifriction metal, grade No. 2, is a satisfactory bearing metal for stainless alloys. The study of the finish on all machined parts revealed the necessity for stricter requirements. There is evident need for a stricter definition of finish and for a more careful inspection to obtain uniformity of finish.

Stainless alloys of the 18-8 variety must not be confused with other stainless alloys, especially stainless iron. The 18-8 variety contains around 18 per cent chromium, 8 per cent nickel, and usually carbon is low, around .07 per cent. Stainless iron contains around 12 per cent chromium and carbon less than .10 per cent. Stainless steel contains 12 per cent chromium, but more than .10 per cent carbon, usually .30 per cent carbon. This grade is sometimes referred to as the cutlery type.

Present parlance, as a result of advertising campaigns to introduce 18-8, is to refer to such material as stainless steel. Such a generic name coupled with similar specific names quickly leads to confusion. The necessity for a satisfactory generic name is realized. Common usage associates the word "stainless" with chromium. "Stainless alloys" appears to be a suitable generic name. Therefore, 18-8 stainless alloy is immediately recognized as being different from stainless iron and from stainless steel. Other varieties of stainless alloys are the straight 18 per cent chromium and the 18-2 or 18 per cent chromium, 2 per cent nickel alloys. Stainless iron is considered a satisfactory material for recuperator cylinders.

DR. P. R. KOSTING.

COLLAPSE OF WELDED TANK

ONE of the most outstanding weld failures of recent years occurred at Tiverton, R. I., November, 1933, when an all-welded tank collapsed under its normal working pressure. The tank had a capacity of 80,000 barrels and was 98 per cent full of sea water at the time of failure. Because of its interest from the welding standpoint the Watertown Arsenal was asked to investigate the cause of failure.

The tank was 117 ft. in diameter, 42 ft. high, and was built up from structural plates 21-ft. long and 6-ft. wide. These were arranged in courses, the thickness of the plates varying from the bottom or the "A" course, where they were 5/8-inch thick, to the top course where they were 3/8-inch thick. The vertical seams were all butt welds. The horizontal seams were made by overlapping the lower course 3 inches over the course next above it. There was no welding on the horizontal seams except for a very light bead around the top of the lower course which was put in to make the joint watertight and not for strength. Hence, practically all of the hydrostatic pressure in the tank was supported by the vertical weld. The collapse occurred due to the failure of one of the vertical seams. This 6-ft. long seam was in the second or "B" course. It was leaking and attempts had been made to repair the leak. Upon the splitting of this vertical weld, the adjacent plate of the "B" course being practically unsupported along the top seams, tore out almost instantaneously.

A second failure occurred, presumably as a consequence of the first failure, in a weld 4 plates away from the first failure and in the same course, that is, in the "B" course. This second failure occurred almost simultaneously with the first failure, that is, the interval between the two failures was a very small fraction of a second. The plates from both the B16 weld, which failed first, and the B3 weld, which failed second, peeled westward toward the shore line, the plates eventually being washed over the top of an 18-ft. dike and into the bay.

A third failure occurred apparently when a heavy surge of water inside the tank washed toward the bay or west side of the tank, which surge tended to topple the tank over toward the west and actually lifted the east side of the tank, causing rupture of the still intact plates on the east side of the tank between weld B16 and weld B3. This same surge together with the weight of the upper courses caused the west side of the tank first to bow outward, then to break so that a section of the west side of the tank about 18-ft. high by 80-ft. long was torn out. This heavy section, weighing approximately 8 tons, was washed outward over the dikes and about 90 feet away from the base of the tank and into the water. This section, except for 2 plates, C9 and C10, went out intact with the rest of the "B" course from the south side of the tank, the whole mass of connected metal weighing about 12 tons. The remainder of the "B" course from the B3 weld, consisting of 5 plates weighing about 5 tons, was also thrown into the bay. The tank fell to the southwest.

The sequence of events, roughly as outlined above, was determined by studies of the fractured welds and collateral evidence.

Investigations of the broken welds were carried out by means of X-ray, tensile and impact tests, and micrographic studies. The welds, in general, looked good on surface inspection. The X-ray pictures, however, showed in the majority of cases evidence of in-

complete fusion of the weld metal with the plate metal and in very many cases cracks between the weld metal and the plate metal. Examination of cut sections showed that for the most part these incomplete fusions and cracks were located inside of the weld metal. The welds were considered on X-ray inspection to be very poor.

Weld B16 that had failed initially had been leaking along one of these poor fusion lines. Attempts had been made to stop the leak, first by peaning and later by welding over the top of the defective section. The repair weld had been ineffective in that it did not extend to the bottom of the defect, the crack that caused final failure being apparently an extension of the original defect out into the repair weld.

Weld B3, the second failure, was also found to be defective. Evidence was present of an old crack which extended partially through the weld metal and which had not been repaired. At another point, however, a repair weld had been made over the top of the old weld, presumably to cover an extensive defect in the original weld. All the welds showed low impact resistance and low tensile strength. However, the welds which did not break were almost as poor in quality as the ones that did. Chemical analysis showed carbon contents of the weld metal as low as .02 per cent while at the same time the nitrogen content was very high. The conclusion that seems inevitable with regard to welding is that the technique of welding was defective. The welds were improperly made due to lack of skill on the part of the operators and perhaps due to lack of knowledge on the part of the inspectors. In fact, there seems to have been very little real inspection of these welds.

Perhaps the primary cause of failure may be tied up with the weld design which placed the total hydrostatic load on the vertical seams which are notoriously hard to make. However, the character of the welding was a very important, if not the most important, cause of the debacle. Among the facts in connection with this collapse of interest to the ordnance engineer are the following:

The welding held up very well considering the poor character of most of the welds. The failure was at least partly due to incorrect design. The largest factor involved in the failure was the presence in the welds of gross defects which would never have occurred in ordnance construction, using the methods of inspection which are employed on ordnance structures. Part of the weld deficiencies may be charged to the fact that improper welding electrodes were used, but most of the welding defects were due primarily to inexpert welders working without adequate supervision on a difficult type of welding.

It is obvious that there is needed in industry some provision for insuring properly trained and supervised welders and for adequate inspection. In Ordnance establishments because of superior training of welders and supervision of their work, defects of the kind found probably would not occur. There is obviously need for carefully worked-out welding specifications and provision for adequate inspection of welds made for the Department in commercial plants.

Dr. H. H. Lester,
Watertown Arsenal, Mass.

Corrosion Under Flax Packing

STUDIES are being made by ordnance engineers toward the elimination of the serious corrosion which occurs under flax packing when used in recuperator mechanisms especially of seacoast matériel. The Garlock Packing Company have submitted flax packing impregnated with paraffin and beeswax. These packings have been tested in the laboratory at Watertown Arsenal together with standard packing material now used in such mechanisms and packing impregnated with standard Army rust-preventive compound. This latter filling was the only one that showed no action upon the metal beneath it. Whether or not this use of rust-preventive compound will meet the necessary mechanical requirements will have to be determined by actual trial. The Company is coöperating and plans to help develop a suitable material out of which packings of the Chevron design can be made. The present material is corrosive to both bronze and steel in glycerine solutions. It is reported that it is not corrosive to monel and stainless alloys in oil.

Recent Patents

ORDNANCE patents recently issued include the following:

No. 1,956,580, to Harry A. Knox, for a flexible track. The main feature of this invention is the spiral link connection between the shoes.

No. 1,956,557, to Orie L. Beardsley, for a gun carriage. This is a gun carriage adapted to be equipped with pneumatic-tired wheels and to provide a structure which permits an old carriage to be readily converted to take such wheels.

No. 1,956,574, to Maj. James L. Hatcher, for a reversible feed mechanism for machine guns, which provides a special cam follower sliding in the cam grooves to give right- or left-hand feed without the employment of a switch.

No. 1,958,420, to Howard S. Deck and Pasquale V. DiCosmo, for a method of and apparatus for liquefying and recovering explosives from a container. The main object of this invention is to have the nozzle conveying steam or hot water into the container automatically advance as the explosive melts so as to maintain the heating element in intimate contact with the explosive to be melted.

No. 1,959,357, to Capt. Elmer C. Goebert, for a gun carriage, in which emplacements are provided to take the carriage off the pneumatic tires when in firing position.

No. 1,959,337, to William F. Beasley, for a special rubber-jointed track for track-laying vehicles.

No. 1,959,401, to David L. Woodberry, for a fuze for bombs which may be set to function at considerable periods of time after dropping the bomb.

Navy Ordnance

THE following account of the activities and policies of the Bureau of Ordnance of the Navy Department appeared in a recent issue of *The Army and Navy Journal*. Rear Adm. E. B. Larimer, U. S. N., Chief of the Bureau is the author of the article. His discussion is of particular interest because it describes the functions of naval ordnance which, with those of the military arms, comprise the full ordnance picture in the United States. The article follows:

AS is the case with all branches of the Navy's shore establishment, the Bureau of Ordnance exists solely to assist in maintaining the Fleet at sea in readiness for any service. Its duties, as set forth by the Laws of the United States, cover everything in connection with the manufacture, procurement, storage, distribution and upkeep of ordnance material of all kinds. This includes, of course, the original ordnance outfit of naval vessels; their guns, torpedo tubes, fire-control apparatus, range-finders, and similar articles. It includes the propellent powders for use in the guns and for the ejection of torpedoes, the explosives for mines, torpedo war heads, and airplane bombs. The Bureau also provides and distributes mines, depth charges and the pyrotechnic material used by both ships and aircraft.

The principal source of supply for the guns and torpedo tubes used in naval vessels is the Naval Gun Factory at Washington, D. C. Designs for guns for new ships originate in the Bureau of Ordnance itself, where they are worked out by engineers and by officers experienced in the design of material of this character. Manufacturing drawings are usually completed by the Naval Gun Factory and the actual work of construc-

tion is accomplished at that place. Forgings for large parts are usually obtained from the principal steel manufacturers of the country. Some small forgings and many steel castings are made at the Naval Gun Factory.

When the first gun of a new type or lot is completed, it is sent to the Naval Proving Ground, at Dahlgren, Va., for proof firing, and for extensive tests to determine that the finished product meets the designed performance. After this initial gun is proved, the manufacture of the remainder is proceeded with, each gun being in turn proved by actual firing before being sent to the place at which it is to be installed in the ship for which it is intended. In general, similar procedure is followed in the case of torpedo tubes. At present, all torpedoes for use by naval vessels are manufactured at the Naval Torpedo Station, Newport, Rhode Island.

At about the same time that a design for a new gun is initiated, the Naval Powder Factory at Indian Head, Md., receives orders for the powder which will be used with this gun in service, and by the time the first gun is ready for trial the powder which will be issued for use in these guns is also ready to be proved by actual firing. Part of the Navy's supply of smokeless powder is procured from commercial sources to keep this industry available for the needs of the Bureau in case of emergency.

Projectiles for use in naval guns are practically all obtained from commercial steel manufacturers. The steel mills of this country have for many years provided the Navy with projectiles, and are an adequate and efficient source of supply for this material. Any new type of projectile which the Bureau may consider desirable to put into service is exhaustively tested at the Naval Proving Ground, both for the performance of the shell in flight and for its penetrative or explosive power against armor plate.

All of the armor with which naval vessels are protected is obtained from commercial sources. During and shortly after the War the Navy Department built at South Charleston, W. Va., an elaborate steel plant, which produced a small amount of armor, gun forgings and projectiles but it was found uneconomical to maintain this plant in operation, and for some years past all armor needed has been obtained from the steel companies of America. From each lot or type of plating which goes into an armored ship, representing the flat side armor, the curved turret or barbette armor, and the tubular type used for conning towers, etc., a representative sample is selected in the early stages of production, and tested at the Naval Proving Ground, to demonstrate that the Bureau's specifications are being met.

Since the World War a large proportion of Bureau of Ordnance activities and a substantial proportion of the funds expended by it have gone to the arming and equipping of naval aircraft. This equipment includes appliances for carrying and releasing aircraft bombs; the design and manufacture of the bombs themselves; of bomb sights, gun sights, gun mounts, and other military equipment. The development of this art has been most interesting, beginning with the adaptation of designs which were available to this country through the war experience of the allied powers in the World War, and gradually evolving into distinctive types which are the direct product of American inventive genius, or the result of American design improvements upon basic foreign ideas.

There are in the Navy two vessels especially designed for the carrying of ammunition, one of which is continuously engaged in transporting ammunition between the points of production, which are usually on the eastern seaboard of the United States, to outlying ammunition depots, and, in recent years, to the Fleet on the Pacific Coast. The other one of these vessels is laid up in reserve, available for recommissioning if and when needed.

One of the Bureau's principal and most involved duties in time of peace is the provision of and distribution to the Fleet of the enormous quantity of target practice ammunition expended each year. In general, vessels of the Fleet, which at all times carry a full allowance of service ammunition, cannot carry, in addition, all of their annual supply of target practice ammunition, and it becomes necessary, therefore, to insure that an adequate supply is available for distribution, at least twice during each target practice year.

The Bureau also provides and maintains in operating condition a number of targets for use at target practices, each one of which is in itself comparable to a fairly good sized ship structure. When, as at present, the whole Fleet moves from one coast to another, the distribution of these target rafts to provide necessary facilities at the new destination involves considerable planning and the assignment of a number of vessels for towing.

In all matters involving coördination and coöperation with the forces afloat the Bureau acts through the office of the Chief of Naval Operations in planning the movements of materials under its jurisdiction.

During the visit of the Fleet to the East Coast, Bureau of Ordnance representatives as well as those of private contractors furnishing ordnance material are visiting certain ships in order to determine how certain ordnance material is functioning after its use afloat and what minor changes may be, in the opinion of the forces afloat who have operated this material, advisable to improve its performance. Certain armament on which improvements have been made by the Bureau will be issued to the ships.

ADVISORY BOARD ON PURCHASES

THE following officers have been detailed as members of a board of officers known as "The War Department Advisory Committee on Purchases," to act upon procurement problems submitted to it by the Assistant Secretary of War or by the chief of any bureau or division of the War Department:

Brig. Gen. William R. Gibson, Assistant to the Quartermaster General; Brig. Gen. Herman W. Schull, Assistant Chief of Ordnance; Lt. Col. Francis B. Wilby, C. E.; Lt. Col. Edgar C. Jones, M. C.; Lt. Col. Clyde L. Eastman, S. C.; Lt. Col. Charles K. Wing, C. A. C., National Guard Bureau; Maj. Ralph E. Haines, C. A. C.; Maj. Alfred L. Rockwood, C. W. S., and Maj. Roy M. Jones, A. C.

The following officers have been relieved as members of the War Department Advisory Committee on Purchases: Maj. Gen. William H. Tschappat, Chief of Ordnance; Brig. Gen. Henry C. Whitehead, U. S. A., Ret.; Col. A. Owen Seaman, Q. C.; Col. John B. Huggins, M. C.; Col. Walter C. Baker, C. W. S., and Maj. Leslie MacDill, A. C.

COMPLIMENTARY REPRINTS

Because of the general interest in the subject of munitions, ARMY ORDNANCE has reprinted in pamphlet form the following data from recent issues, copies of which will be sent without cost upon request:

FACTS ABOUT "MUNITIONS MAKERS" (Editorial from the May-June, 1934, issue)

FACTS ABOUT MUNITIONS MAKERS II (Editorial from the July-August, 1934, issue)

MUNITIONS MAKERS AND COMMON SENSE, by Hoffman Nickerson (The leading article in this issue)

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Book Reviews

HIGH COMMAND IN THE WORLD WAR. By William Delworth Puleston, Captain, U. S. N. New York: Charles Scribner's Sons. 1934. $3.00.

CAPTAIN PULESTON is well qualified to be the author of a book bearing such a title as this. From July, 1914, to December, 1916, he was at the U. S. Naval War College, closely following the events of the World War as they transpired. He spent 1917 with the Asiatic Fleet visiting Japan, China and Vladivostok, where he saw the results of the war in the Far East; from January to December, 1918, he served with the U. S. naval forces in European waters. Two leaves of absence during the U. S. participation in the war enabled him to visit the Western Front and the Grand Fleet, giving him a bird's-eye view of several fronts of the war as it ran its course. After the war, four years at the Army War College gave him a better picture of the land war and an opportunity to study and compare many of the books and to listen to lectures on the war by some of the principal actors, both civil and military.

The title of this book is somewhat a misnomer. For the first two years of the war, the book is practically an epitome of the international diplomatic, domestic political, strategical and general broad tactical history. The author briefly but adequately describes the causes of the war and suggests to the reader that he purge his mind of many of the distorted ideas concerning the World War, if he wishes really to understand its causes, operations and effects.

The treatment of the subject matter is not chronological but rather a cause-and-effect arrangement with the international diplomatic intrigue and domestic politics first depicted and then their effects upon the conduct of the war. The strategic aims of the commanders are similarly first portrayed and then the tactical means by which the aim was sought to be reached is related. This method of treatment serves the useful purpose of emphasizing the correlation of many governmental and military policies. It is a Belloc-like method: interest-sustaining by the departure from chronological sequence.

Prominently throughout the book the effect of the shortage of munitions is mentioned. Likewise, the author shows the great inefficiency in attempting to conduct a war by cabinets and committees, with actions based on concurrences and compromises, as France and England did. He contrasts these conditions with the efficiency of the German method of decision and command vested in one person.

Unfortunately, but few charts or maps are in the book. Of the eight charts, three relate to the battle of the Marne and the German march through Belgium, and the other five relate to the Battle of Jutland. Over thirty pages are devoted to this naval battle while the last two years of the war and the American participation therein are covered in less than three pages. It may be that the crucial character of the naval contest entitles it to such an extensive treatment; and it may be that in the last two years of the war the high commands did nothing which merits or invites analysis and comments. Nevertheless, when the reader finishes this book he can not help but wish that Captain Puleston had covered the last two years of the conflict as splendidly and thoroughly as he did the causes of the war and its first two years. "High Command in the World War" is well written; it is well worth reading and no library of military and naval events of 1914-1918 is complete without it. R. M.

SOLDIERS WHAT NEXT! By Katherine Mayo. Boston: Houghton Mifflin Co. 1934. $3.50.

MISS KATHERINE MAYO'S research into the pension aftermath of the World War is a notable public service. After a detailed study of conditions in our own country, she examines the status of the care of the wounded and of the widows and orphans in France, Germany, Italy and England. The comparison is far from creditable to this country. Other nations care more generously for the deserving victims of the war than we do, but no other nation is victimized as is the United States by able-bodied veterans who feel the government owes them a living. If the shameful conditions described are the consequence of indifference due to ignorance let us hope that Miss Mayo's illuminating book will rouse the self-respecting veteran and the intelligent citizen to a sense of reality and proportion in this essential post-war business of government. This book is readable and convincing documentary evidence that our methods of handling veterans and their dependents is in dire need of drastic overhauling. D. A.

THE GHOST OF NAPOLEON. By Liddell Hart. New Haven: Yale University Press. 1934. $2.50.

WE are indebted to the Yale University Press for a review copy of this splendid work of Capt. Liddell Hart. The same book as published by Faber and Faber, Ltd., London, was reviewed in the July-August, 1934, issue of this journal, page 50. We refer readers both to the review and to the book itself. The libraries of the constantly growing number of admirers of Capt. Liddell Hart's studies will lack one of his best if this volume does not grace the shelves.

POCKET ALMANAC OF AERONAUTICS, 1934. By Dr. Ing. Werner v. Langsdorff. Munich: J. F. Lehman's Verlag. 1934. Marks 10.

THIS handbook is a comprehensive survey of the aeronautic equipment for all states of the world. It is profusely illustrated with photographs or drawings of every type of ship in use in the various countries during the past year. There are also tables showing the characteristics of the principal types of aircraft and the text, as formerly, is in German, English and French. Lighter-than-aircraft and gliders are included in the descriptive matter and there is a complete index. For the student of military mechanization this handbook, like that on "Tanks" by the late Fritz Heigl, is quite indispensible. O. .E. D.

WAR OF TOMORROW

(*Continued from page 82*)

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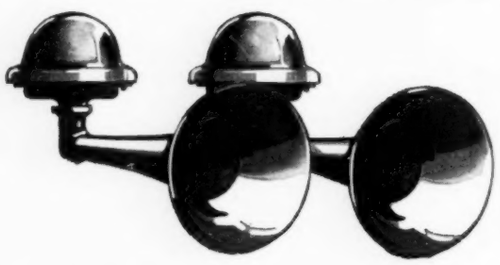

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